

A PROJECT REPORT ON  
**AUTOMATION OF Ph.D. PROGRAMME SELECTION PROCESS (MODULE I) FOR  
RAMAN RESEARCH INSTITUTE**

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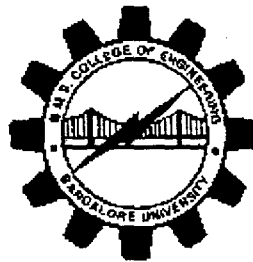
**DATABASE MANAGEMENT (Using C++) AND ACTIVE WEB PAGE DESIGNING FOR  
ASTRONOMICAL SOCIETY OF INDIA**

By:  
**Sreenivasa K P**

Submitted to  
**BANGALORE UNIVERSITY**

In partial fulfillment of the requirements for the award of the degree of  
**MASTER OF COMPUTER APPLICATIONS**

PROJECT WORK CARRIED OUT AT  
**RAMAN RESEARCH INSTITUTE**  
BANGALORE -560 080

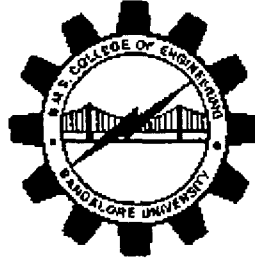


DEPARTMENT OF PG. STUDIES  
**B.M.S. COLLEGE OF ENGINEERING**  
BANGALORE - 560 019  
1998-1999

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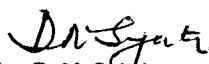
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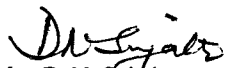
DEPARTMENT OF PG. STUDIES



## CERTIFICATE

This is to certify that the project works titled **AUTOMATION OF Ph.D. PROGRAMME SELECTION PROCESS (MODULE I) FOR RAMAN RESEARCH INSTITUTE & DATABASE MANAGEMENT (Using C++) AND ACTIVE WEB PAGE DESIGNING FOR ASTRONOMICAL SOCIETY OF INDIA** were carried out by **Mr. Sreenivasa K P** [Reg. Number 961588] student of 6th Semester M.C.A in partial fulfillment for the award of M C A Degree of Bangalore University during the year 1998-99 at **RAMAN RESEARCH INSTITUTE, Bangalore - 560080.**

  
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EXAMINERS :

1. \_\_\_\_\_

2. \_\_\_\_\_

(seal)

# RAMAN RESEARCH INSTITUTE


C.V. Raman Avenue, Sadashivanagar, Bangalore – 560 080 India



## CERTIFICATE

This is to certify that the project report entitled **Automation of Ph. D. Selection Process (MODULE- I ) for Raman Research Institute & Database Management (using C++) and Active Web Page Design for Astronomical Society of India** submitted by **Mr. SREENIVASA .K .P** in partial fulfillment of the requirements of the award of the Degree of Master of Computer Applications, Bangalore University, is a bonafide record of the work carried out at **RAMAN RESEARCH INSTITUTE, Bangalore** from 1st May 1998 to 15th October 1998 under my supervision and guidance.

Date : 10/10/1998

  
Signature of the Guide

[ Dr.DIPANKAR BHATTACHARYA ]

*Golden Jubilee Year : 1998*

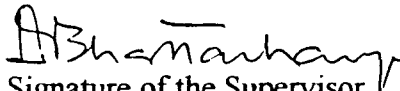
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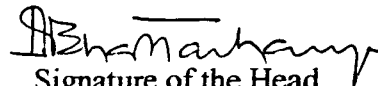


## TRAINING REPORT

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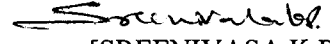
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## DECLARATION

I hereby declare that the entire work embodied in this dissertation has been carried out by me and no part of it has been submitted for any degree or diploma of any Institution or University previously.

Place : Bangalore  
Date : 15/10/1998

  
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Signature of the Student

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## ACKNOWLEDGMENT

With profound sincerity and gratitude I acknowledge

### **RAMAN RESEARCH INSTITUTE**

<b>Name</b>	<b>Designation</b>	<b>Purpose</b>
<b>Prof. N. Kumar</b>	Director, RRI	For permitting us to carryout the project work at Raman Research Institute.
<b>Dr. Dipankar Bhattacharya</b>	Head, Computer Section	For permitting and providing us with a project with necessary Guidance to complete the project.
<b>Mr. Bala Iyer</b>	Convener, Admission Committee	For his invaluable support and guidance through out the project
<b>Mr. Jacob</b>	System Administrator	For his help &Co-operation
<b>Mr. Shridhar</b>	System Administrator	For his help &Co-operation
<b>Mr. Nandakumar</b>	System Engineer	For his help &Co-operation
<b>Mr. Jayatheertha B. S</b>	Trainee Engineer Computer Division	For his help &Co-operation

*Sreenivasa K P*

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*Sreenivasa K P*

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**Automation of  
Ph.D. Programme  
Selection  
Process  
Module (I)**



**Introduction**

### 1.1.0 Organization Profile

The Raman Research Institute was founded by Nobel Laureate Sir C.V. Raman in 1948 with funds from private sources. The main activity of the Institute was basic research in selected areas of physics, which were of particular interest of Prof. Raman. The Institute owes its origin to the action of the Government of Mysore in gifting to the Indian Academy of Sciences a plot of land in Bangalore in December 1934. In the year 1956, Prof. Raman made an irrevocable gift to the Indian Academy of Sciences, of various movable properties for the use and the benefit of the Raman Research Institute.

After Prof. Raman's death in November 1970, the Indian Academy of Sciences created in July 1971 a public charitable educational Trust by the name Raman Research Institute Trust (RRI Trust). The Academy transferred to the Trust the lands, buildings, deposits, securities, bank deposits, moneys, laboratories, instruments and other movable and immovable properties held by it for the purpose of RRI. One of the main objectives of the RRI Trust it is principally to maintain, conduct and sustain the Raman Research Institute.

The Institute was reorganized in 1972 and started receiving funds from the Department of Science and Technology of the Government of India. The Institute is administered by a Governing Council.

Currently, the main areas of research are Astronomy and Astrophysics, Liquid Crystals, Theoretical Physics, and Optics. There are about 180 Scientific and Technical staff working at the Institute.

Prof. V. Radhakrishnan was the Director during the period 1972-1994. The present Director is Prof. N. Kumar.

### 1.1.1 Astronomy And Astrophysics

Individual scientists of the institute are primarily engaged in research in specialized areas of Astronomy / Astrophysics that are of interest to them. The current areas of interest of some individuals are

- Neutron Stars
- Pulsar radio emission from Neutron stars
- Neutron stars in binary systems
- Molecular gas in our Galaxy
- Neutral and Ionized Interstellar gas in our Milky Way Galaxy
- Interstellar medium of external galaxies
- Cosmic Microwave Background
- Intergalactic Medium
- Radio Galaxies
- Clusters of Galaxies
- Gravitational lensing

### 1.1.2 Research with International Facilities

The international community of astronomers have usually allowed “equal opportunity” access to facilities across the world to all astronomers. The scientists of RRI have successfully competed for time on international radio telescopes and conducted research with these facilities based on the merit of their research ideas and proposals.

The following international observing facilities have been used by various astronomers at RRI :

- The Very Large Array, Socorro, USA.
- The Very Long Baseline Array, Socorro, USA.

- The Australia Telescope Compact Array, Narrabri, Australia.
- The 64-m Parkes Radio Telescope, Parkes, Australia.
- The 30-m millimetre wave Telescope, Pico Valeta, Spain.
- The Plateu de Bure millimetre wave Interferometer, France.
- The Weterbork Synthesis Radio Telescope, Dwingeloo, The Netherlands.

### 1.1.3 Physics and Chemistry of Liquid Crystals

The Liquid crystals laboratory of the Raman Research Institute is about 25 years old, and is known for many important contributions to the field. To cite a few:

- Both experimental and theoretical studies on the rather fascinating optical properties of chiral liquid crystals
- Studies on some remarkable phases and phase transitions exhibited by highly polar materials.
- Investigations of phase transitions under high pressures.
- Exploring structures of and interactions between novel topological defects.
- Dynamics of solitary waves.
- Theoretical investigations on unusual flow regimes of nematic liquid crystals including electrohydrodynamic instabilities in these media.
- Studies on growth phenomena in both nematic and smectic liquid crystals and
- Formation of liquid crystals from a monolayer.

Many of the experimental investigations have been carried out on material synthesized in our chemistry laboratory. In addition to these basic research topics, the laboratory was involved in a joint effort with Bharat Electronics Limited to develop an indigenous know-how for the manufacture of twisted nematic LCDs. Further, a novel multiline addressing scheme was developed for multiplexing large matrix displays.

The laboratory has a variety of sophisticated equipments like an image plate for X-ray studies, different types of spectrophotometers, a superconducting magnet, photon correlator, etc..

#### 1.1.4 Optics

A state-of-the-art Optics Lab is currently being set up, with a view to studying:

- Coherent back scattering
- Imaging through turbid media
- Light amplification in random media
- Geometrical phase (Pancharatnam / Berry Phase) and Polarization optics
- Nonlinear states
- Atom trapping and cooling
- Entangled photon states

#### 1.1.5 Theoretical Physics

The theoretical physics activity in the Institute has centered around relativity and gravity, quantum theory, optics, and some selected areas of condensed matter physics.

The current activity in gravitation centers around two themes: gravitational radiation and quantum gravity.

Gravitational radiation is a major area of interest to the group. The interest stems from the fact that by the year 2000 gravitational wave detectors like the LIGO and VIRGO should be operational and begin to look for gravitational waves generated by inspiralling compact binary systems made of neutron stars or black holes.

Considerable theoretical work in the area of optics has been concerned with the geometric phase and polarization optics. In fact, the first geometric (Berry) phase in this

context was thoroughly analyzed by S. Pancharatnam, a student of C.V. Raman, in the 1950s in the context of his own experiments on crystal optics. This work was not fully appreciated for a long time, but with revival of interest in this area in the late 1980s, a general formulation emphasizing the generality of the concept ( no restriction to unitary evolution, closed paths) was developed, and interest in this area continues.

### **1.1.6 Electronic Instrumentation Laboratories**

Raman Research Institute has three laboratories for developing electronic instruments. Developmental work is done in both analog and digital instruments. The primary aim of the laboratories is to support basic research in astronomy and physics.

### **1.1.7 Radio Astronomy Laboratory**

This laboratory caters to the needs of research in Astronomy and Astrophysics, and is equipped with state-of-the-art analog and digital test equipment. Developmental activities include design and construction of Feeds and Receivers for various radio telescopes operated by the Institute and NCRA-TIFR. Digital Signal Processing is a major activity of the laboratory.

### **1.1.8 Liquid Crystal Display Laboratory**

This laboratory is attached to the research group on physics of liquid crystals. Devices are developed and built for various addressing techniques of LC displays.

### **1.1.9 Instrumentation Cell**

This unit which is housed within the Radio Astronomy Laboratory undertakes development of electronic instruments for various experimental setups in the liquid crystal laboratory and optics laboratory.



### **1.1.10 Computing Facility**

The Computer Division of RRI caters to the various computing needs of the different research and development groups in the Institute. Most of the computing systems are located in the Main Computer Room which is on the first floor of the Library building. Two secondary computer rooms are located in the Main Administrative block, and another computer room is coming up in the New Theoretical Physics block. There is a campus-wide Network (RRI LAN) by which all the computers can be accessed from any building within the campus.

At present the computing facilities include a number of state-of-the-art workstations (mainly DEC Alpha and Sun system), laser printers, 8mm exabyte and 4mm DAT tape drives, a number of X86 and Pentium PCs, a color copier-cum-printer, and email and internet connectivity. A number of software packages for data processing, word processing, graphic displays etc. are available on many platforms. The main operating systems used are UNIX, MS DOS, Linux and Windows95.

The latest acquisitions by the Computer Division are a 10-cpu Enterprise 4000 Ultrasparc server with a throughput in excess of 1 Gigaflops and a dedicated direct 64 Kbps Internet Link via VSNL gateway in Bangalore.

### **1.1.11 Institute's Student Programmes**

Institute also operates some of the programmes like

#### **1.1.11.1 Ph.D. Programme**

The Raman Research Institute operates a Ph.D. Programme into which students are admitted annually in the month of August. Opportunities are open in all major areas of research interest in the Institute. In addition to this, students joining the Joint Astronomy

Programme of the Indian Institute of Science also have the opportunities to work at the Raman Research Institute.

#### **1.1.11.2 Engineering Trainee Programme**

This programme offers an "on the job" training to recent Engineering graduates for a period of about two years. A stipend is paid during the training.

#### **1.1.11.3 Summer Student Programme**

Under this scheme students get an opportunity to have a first hand view of the ongoing research activities at RRI and to participate in one of the research projects. During the year 1998, RRI will hold a special Golden Jubilee Summer School in lieu of the regular summer programme. Students doing their M.Sc. / B.E. / B.Tech. (and B.Sc. in exceptional cases) are eligible to apply.

#### **1.1.12 Other Facilities at RRI**

- RRI has got a good library.
- Engineering Work shop facility
- General sheet metal fabrication facility.

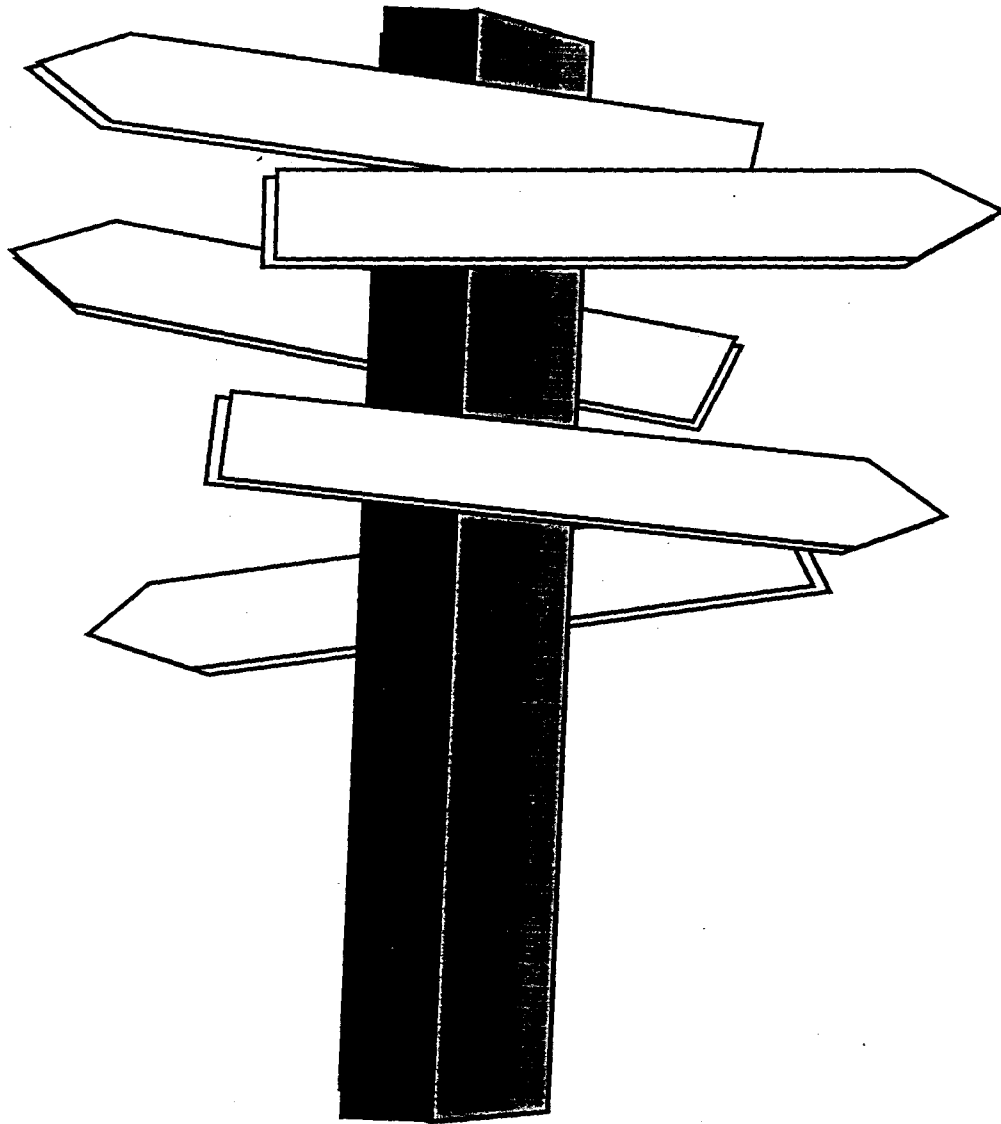
### 1.2.0 Ph. D Programme

The Doctor of philosophy is a five-year course conducted at Raman Research Institute. The Students admitted to this course will be assigned with the Guide. Based on the area of research the faculty will conduct the classes. The first year of the course is just a course work. The students need to prepare some documents on that particular area.

They will be awarded with some points to pass on to the next semester/year. These points are graded based on the performance of each student i.e., the observation work, thesis presentation, seminar etc.

They will be awarded the grades A, B, C etc based on the total points they have secured through the preliminary work. Theory tests are conducted apart from the observation work.

Finally the degree is awarded to them through the Jawaharlal Nehru University (JNU). The examiner for the final submission will come from this university and assess the student for the award of the Doctor of Philosophy (Ph.D).



## Design Overview

## 2.0 Design Overview

### 2.1 Existing System

Currently at Raman Research Institute for the selection of candidates to Ph.D. Programme they are using the system which is developed in dbase III plus. In this case the as soon as the application is received from the candidate the application details are fed into a computer data entry form. Later this is processed. Most of the things involved in the selection procedure are purely done manually. When it comes to queries and reports it is not supporting all kinds of queries what the Institute is in need. The main objective of moving to the new software is the current needs, sophistication, user friendliness and to automate the most of the procedures.

Main works like selection of candidates to the written test, Interview the whole thing has to be automated. The Institute has to get the different kinds of Reports and Queries which has to submitted to its authority. The current system fails to give many of the desired Reports currently these are done manually. When it comes to Mails and Labels currently all the labels will be printed on the ready standard sized labels and later it has to stucked on to the correct letters. There will be thousands of letters to be posted so there will be lot of chances of misplacing the letters. So they are in need of a system that can avoid all these confusions and reduce their work load and whatever the work is done it should go smooth and correct.

Since dbase III plus is not a Graphical User Interface it is not much user friendly when compared to the current Graphical User Interfaces. So all these Constraints lead the Institute to go for the new System. So the Institute opts for Visual Basic 5.0 the best Graphical User Interface available in the market at present and it uses MS- Access 97 as its backend.

## 2.2 Proposed System

The Proposed system is being developed using Visual Basic 5.0 as the front end and MS-Access as Back end and MS-WORD 97 for Mailing and Labels. The Proposed system is developed to overcome all the disadvantages and the problems they are facing with the current system. The proposed system will handle all the current needs for the selection process of candidates for the Ph.D. Programme.

The proposed system designed and developed not only just come over the defects of the existing system. It has also considered the future needs of the Institute and designed for the best of the current market.

The proposed system covers all kinds of reports what the Institute needs this also covers what the existing system was failed to give the reports. The proposed system is mainly concentrated on automating the selection procedure to reduce the manual work in selecting the students for the programme.

The only thing that left as manual in the system is the final selection of candidates for the programme. The reason to leave this part as manual is the number of intake of students for each programme will vary from year to year. This is dependent on the student's performance in the Written Test and Interview and as well as the number of opportunities available at present in the Institute in each field research. The number of intake also depends on the professors who are ready to guide the incoming students.

Coming to the labels and mails in the system for each student they use to peel the address for each of the letter. Now in existing system using the Mail Merge option of the MS-WORD the address are directly printed on letters and labels using the database directly. More over the proposed system is developed using the best GUI like VB 5 it more user friendly than the existing system.

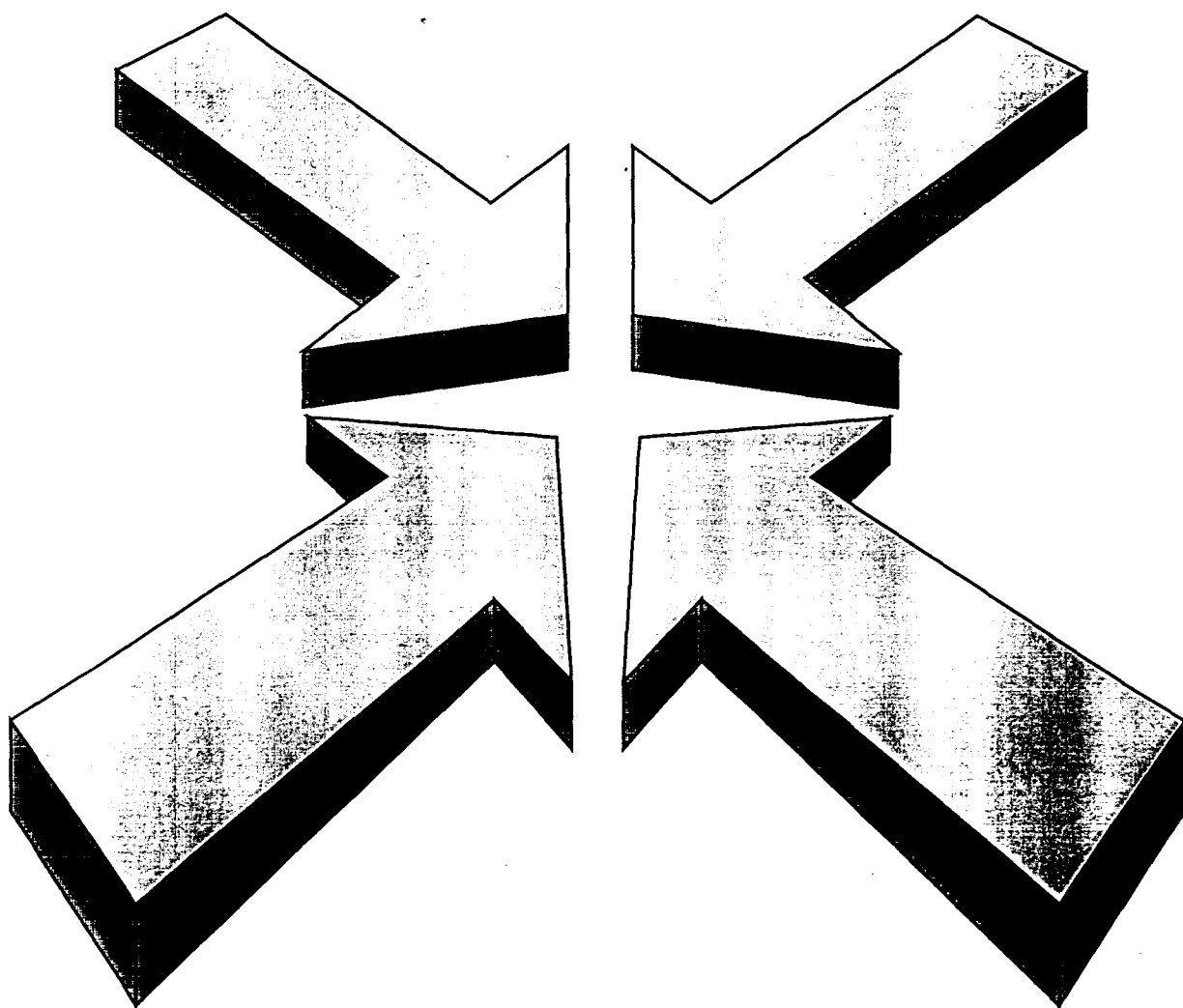
### 2.3 Perspective

The Ph.D. Programme Selection System will perform as Individual and Independent application of Raman Research Institute. This software is currently used in Raman Research Institute for the Administrative Department for the selection students for the Ph.D. Programme.

The task of developing an Automated Selection Software System for Ph.D. Programme for Raman Research Institute involves design and implementation of the whole system.

### 2.4 Objectives

- This module would be used mainly to the selection of candidates for Ph.D. Programme
- To keep record of each year's number of applications received, called for test, called for interview and selected.
- To avoid manual labour involved the selection process.
- To avoid the mistakes and time consumption in the selection process.



## **Implementation Procedure**



### 3.0 Implementation Procedure

#### 3.1 Database Design

The different tables used in the database are

Application Table (APPLN)

University / Institute Table (UNITY)

Subject Table (SUBJECT)

State / Province Table (STATE)

Area of Interest Table (AREA\_INT)

Selected to Test Table (SELECTED\_TO\_TEST)

Selected to Interview Table (SELECTED\_TO\_INTER)

Final Selected List Table ( FINAL\_SELECTED)

Temporary Selected Table(SELECTED\_TEMP)

The Application Table contains the information like the application No., Last Name, First Name, Address, Phone, Subject, State, Sex, University, Degree, Subject studied in the Degree, Final years Percentage, Aggregate Percentage, Recommendations requested from, summer student, GATE percentage, Area of Research of Interest etc. Here the Application Number acts as a primary key where in , based on this number only the whole selection process proceeds. The application Number acts as a key agent for the whole software. In this table there is an important field called as status flag which shows the applications status at any point of time. That is whether the application is selected to test or interview or what else.

The other tables used in this Software (Module II) are

Unity Table which is used to store all the details about an University / Institute rating or other details.

State Table which is used to store all the details about the state / province of India.

Subject Table is used to store all the details about the subjects that the students have been studied in their final exams. Only those candidates are eligible to the course whose final degree subject is one of the subjects which are listed in this table.

Area of Interest Table is the table which stores the information about the area of research that RRI will prefer. This table has all permutation values of these areas of research according to the preferences of a candidate.

Selected to Test table will store the information of only those candidates who have been selected for written test.

Selected to interview will store the information of only those candidates who have been selected for interview.

Final Selected List Table will store the information of only those candidates who have been selected for the Ph.D. Programme along with the information of what is the area of research allotted for that candidate.

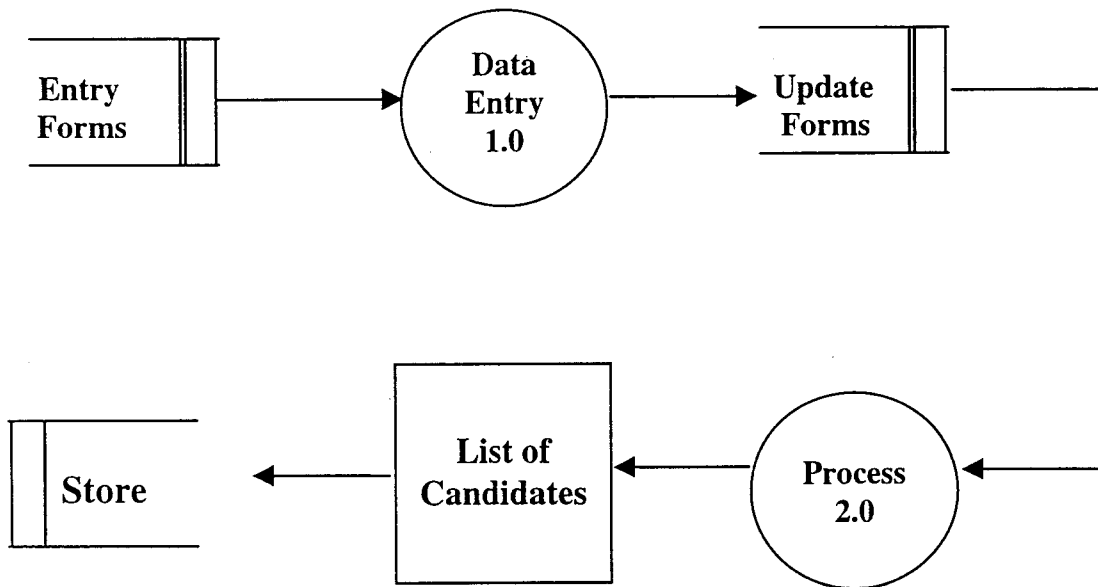
Temporary Selected Table is that table which is used to store the information temporarily selected candidates during the process of any kind of selection. Because at the time of selection if any criteria changes means the number people and the people selected both will change. For this reason the data will be dumped in the temporary table first.

In all these tables the codes given acts as the primary key for the software. The subject code, state code, area of interest code and University code.

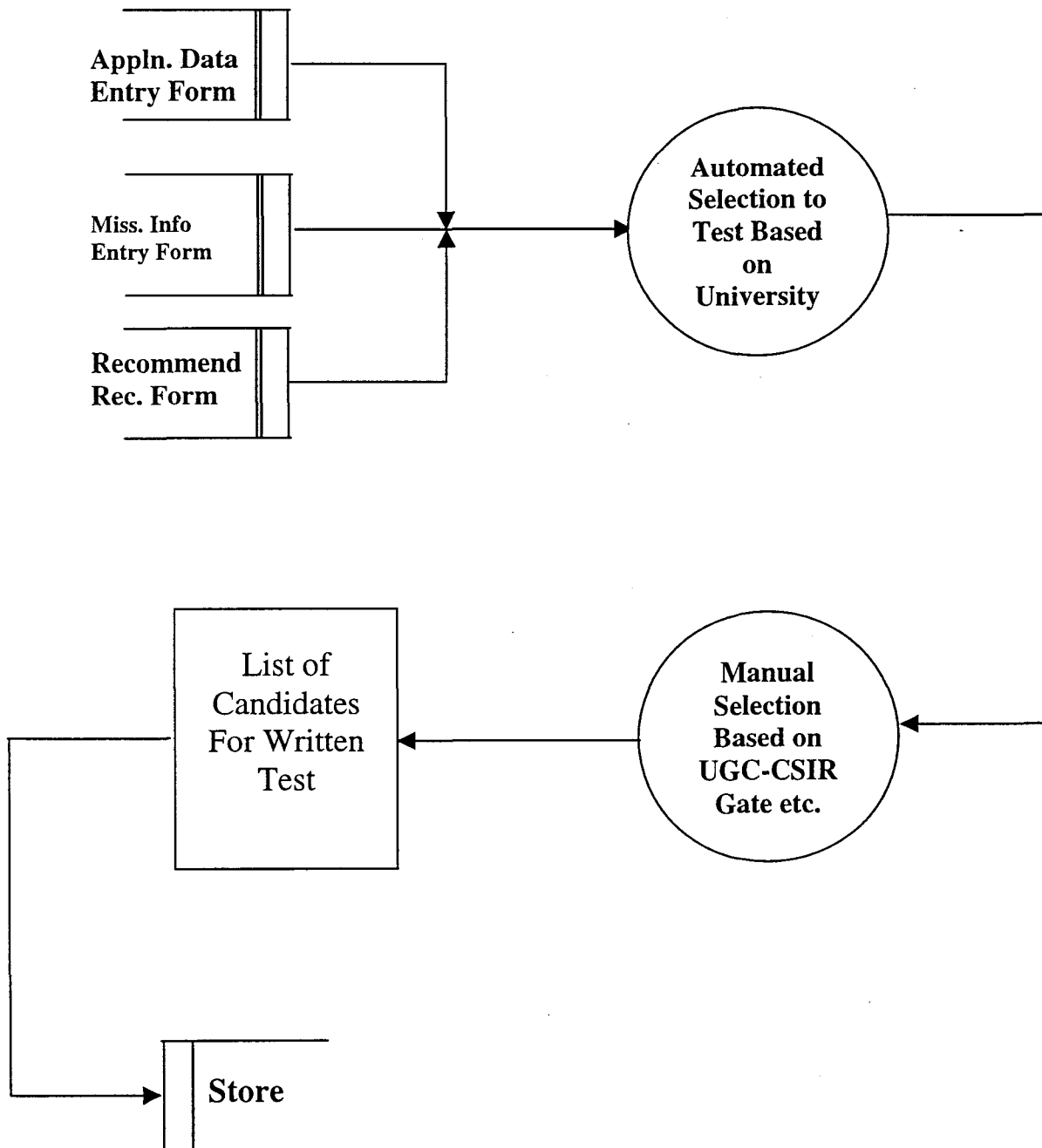
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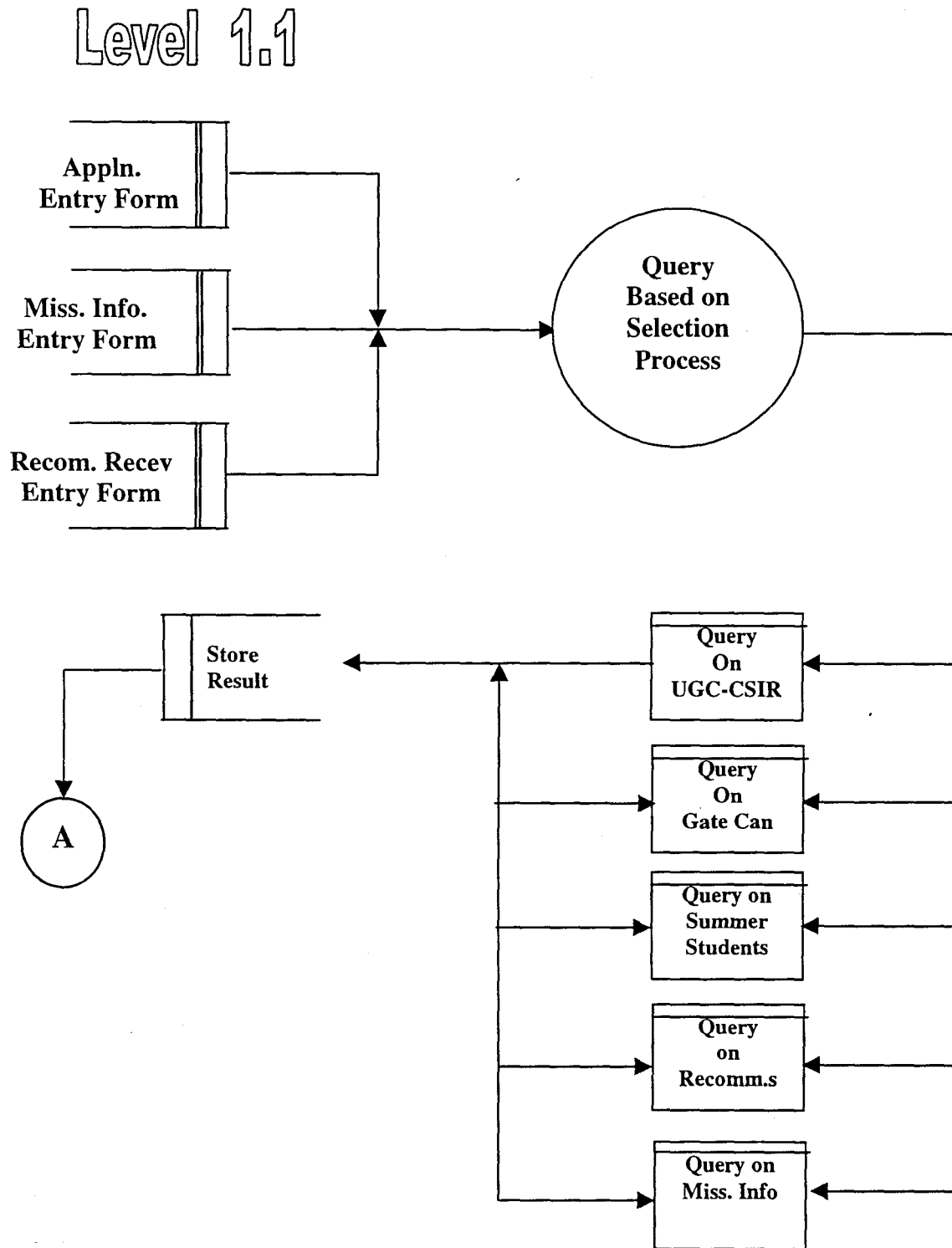
### 3.2 Data Flow Diagrams

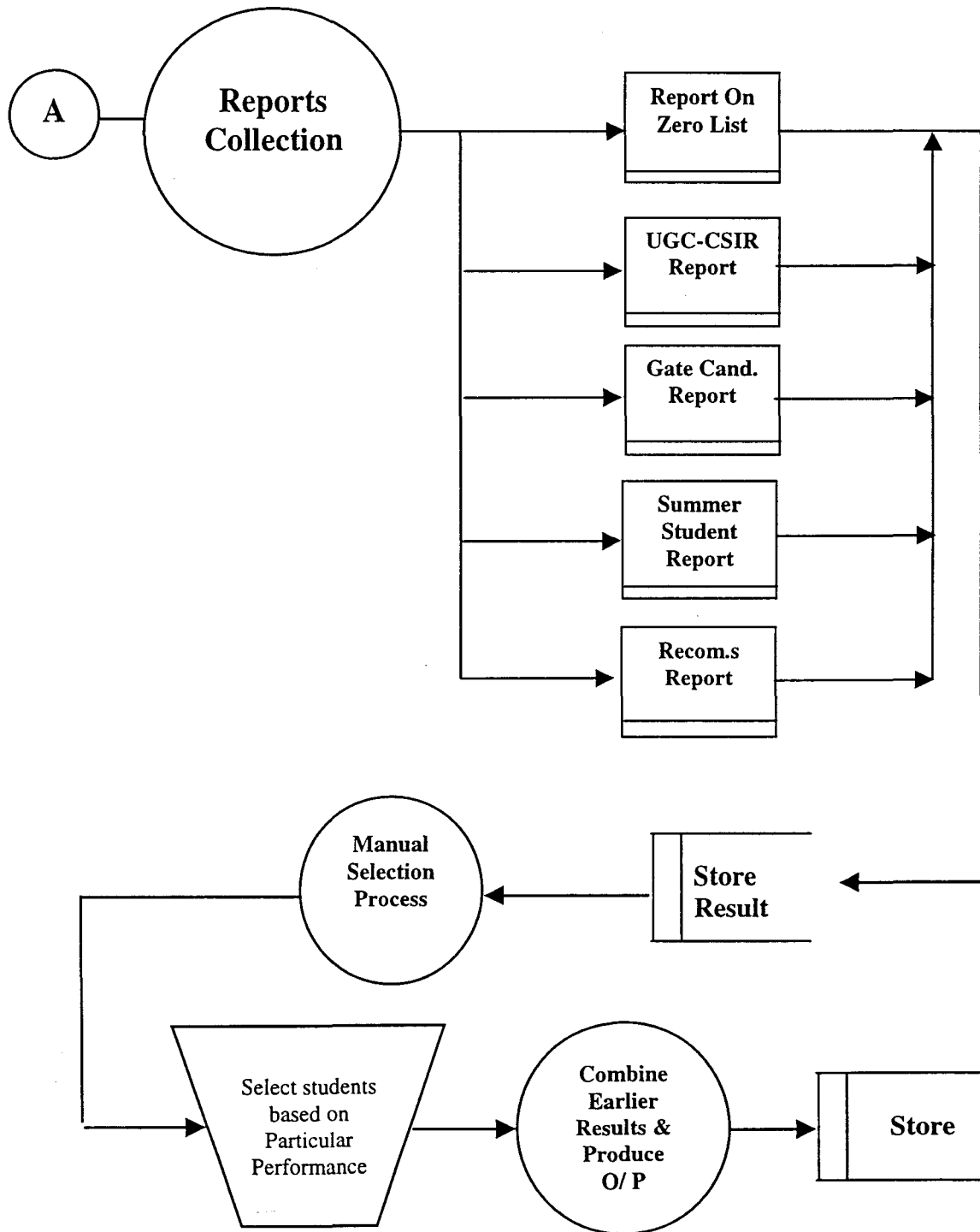
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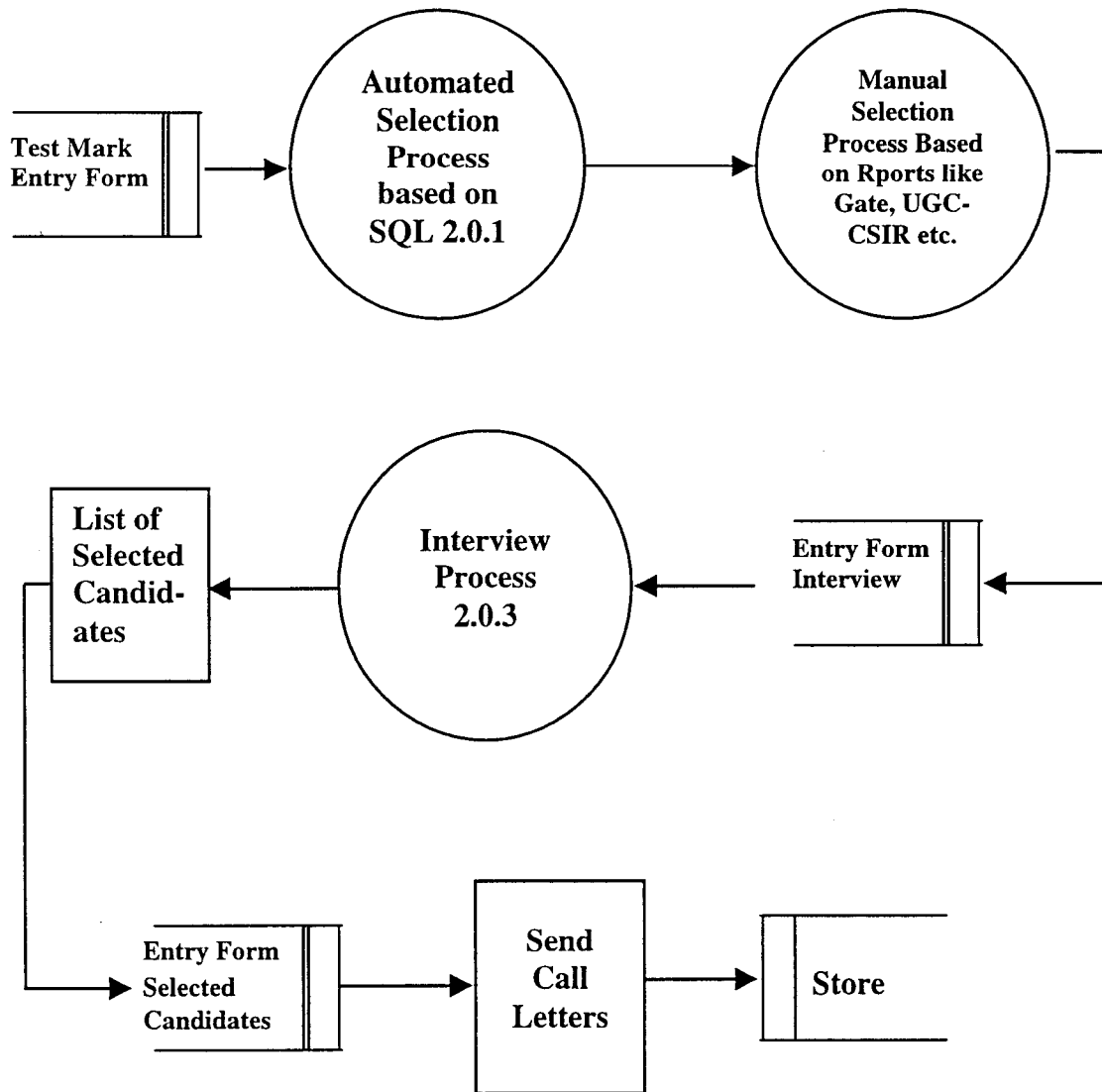
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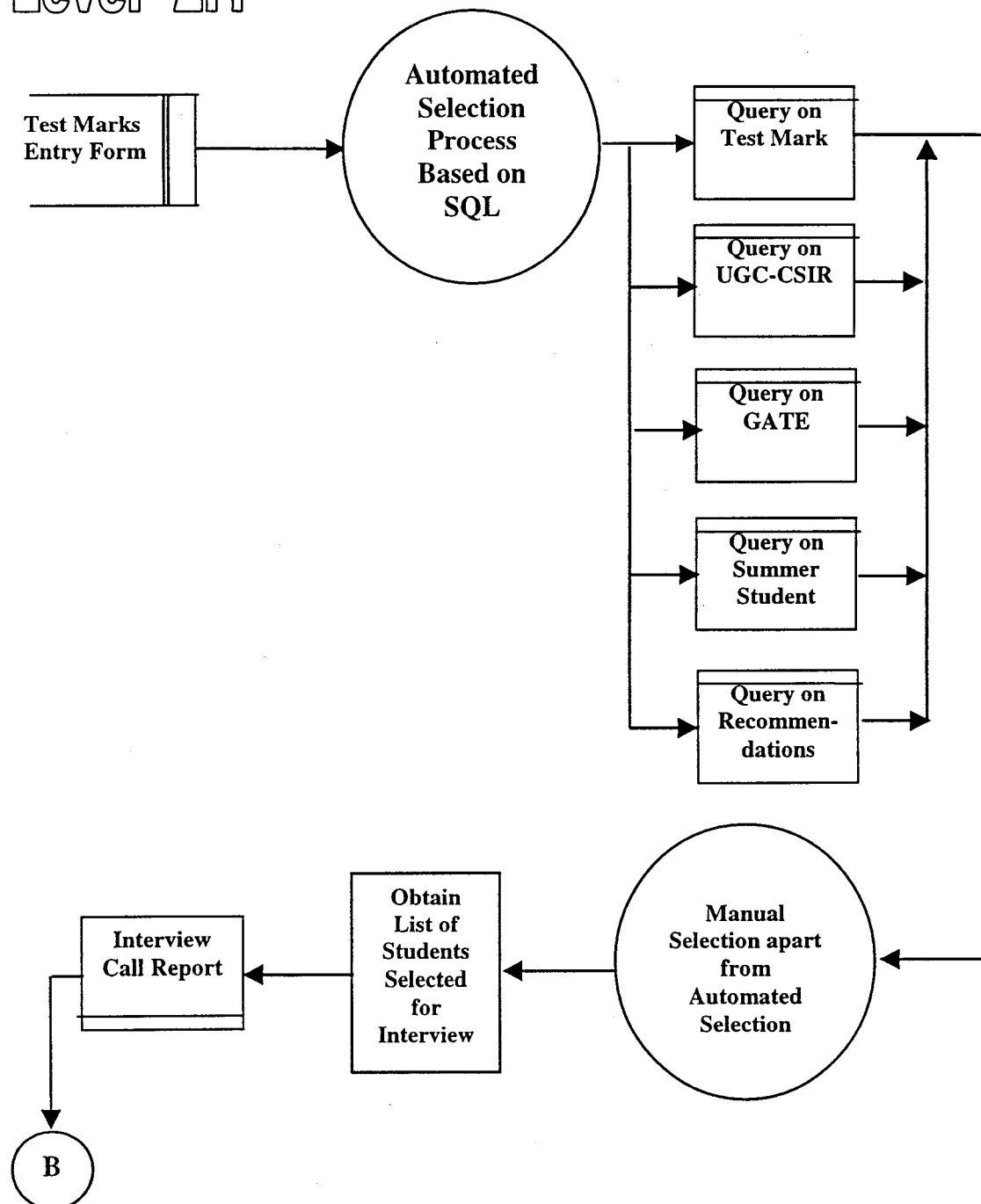


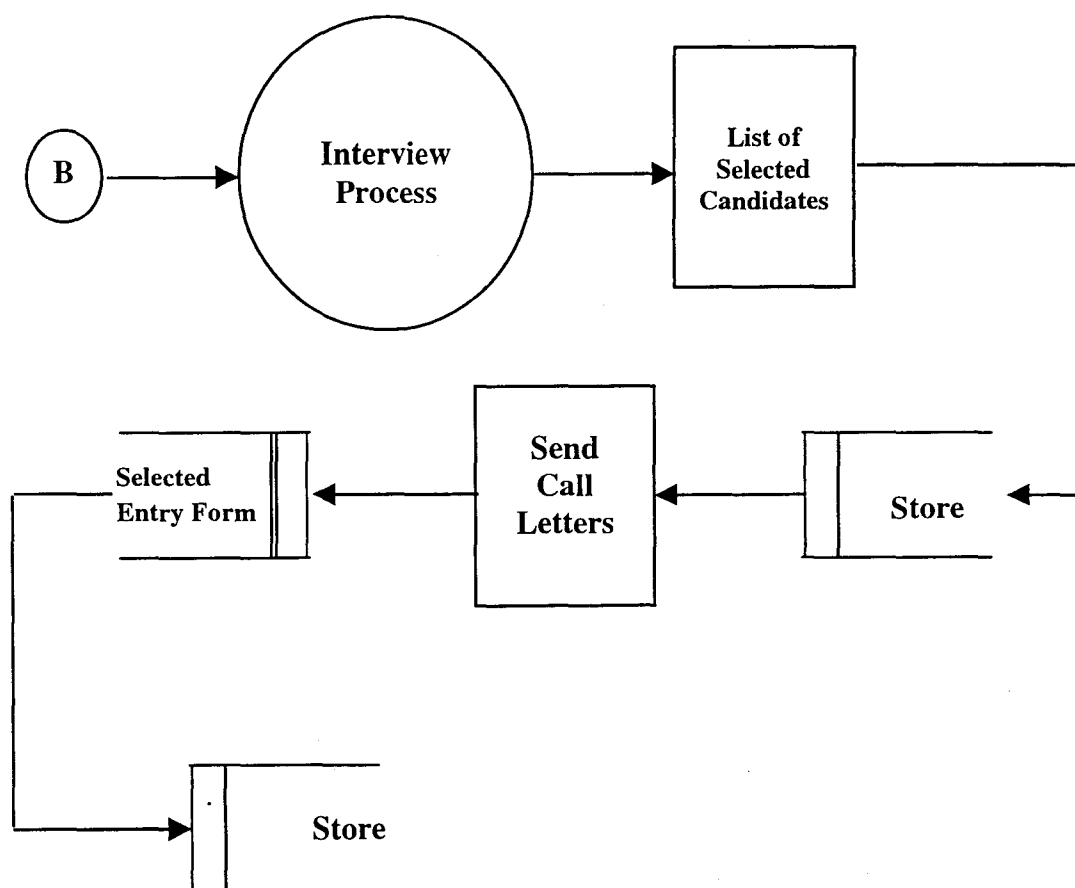
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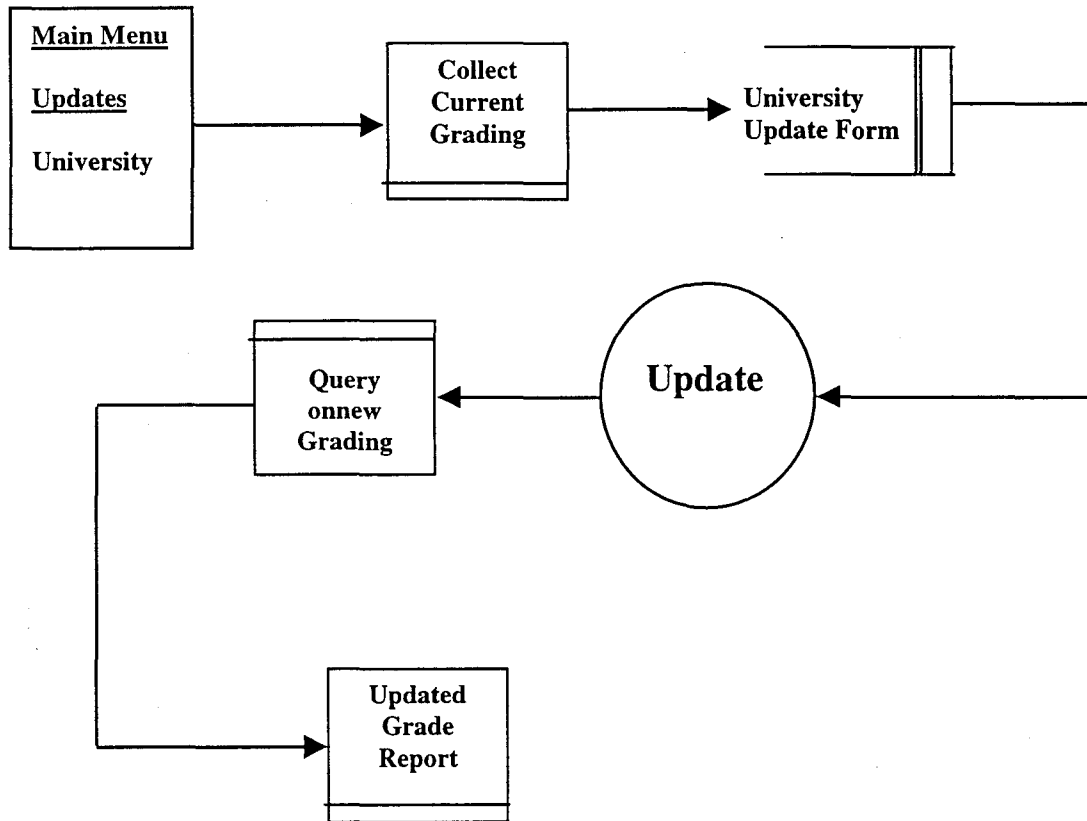


## Level 2.1

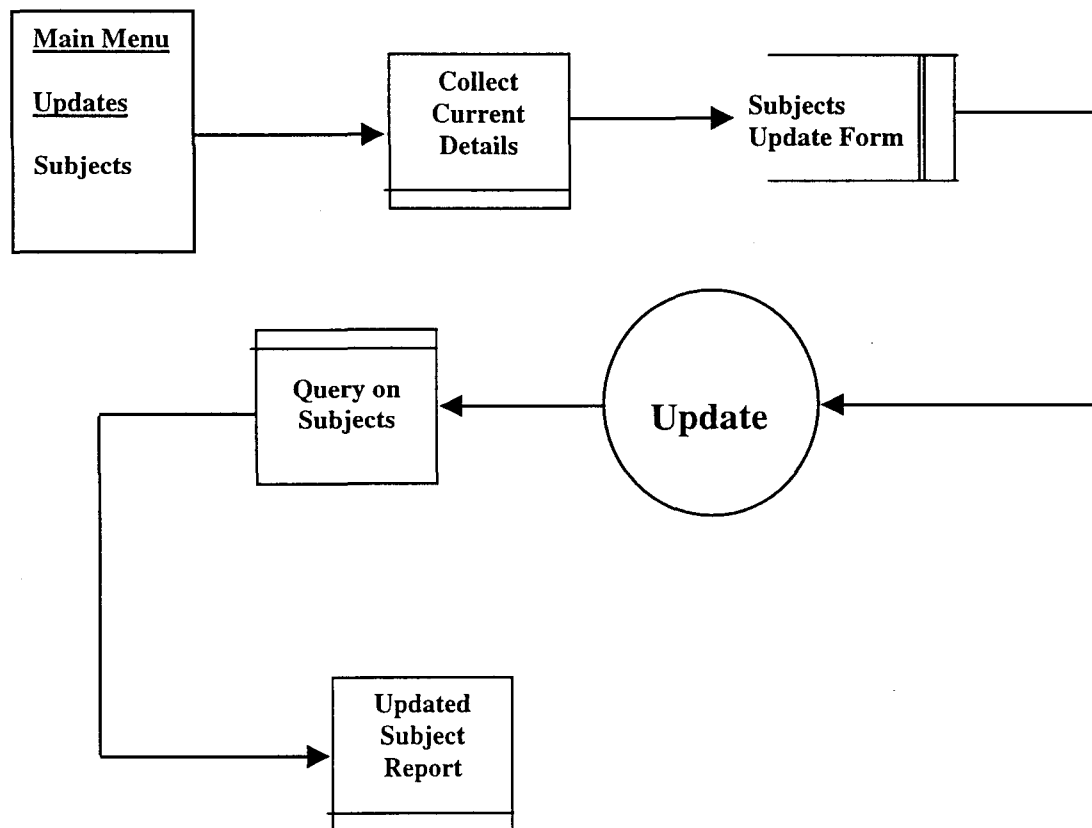




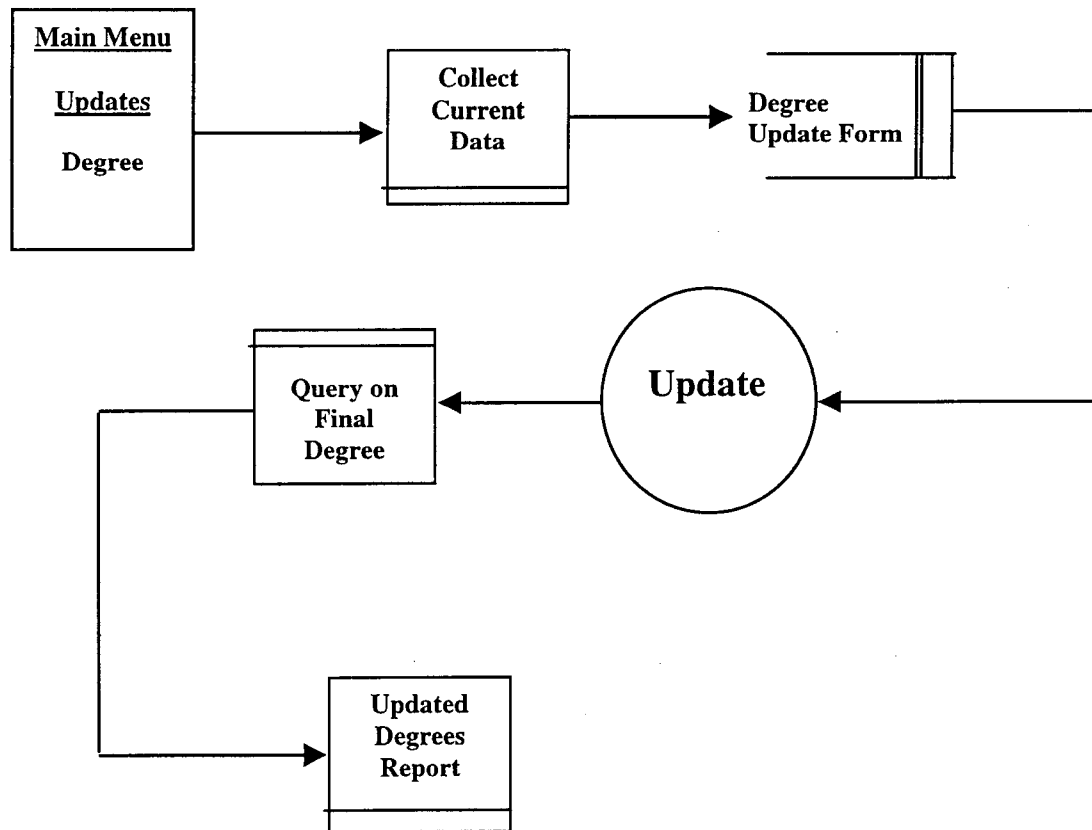
# University Grading



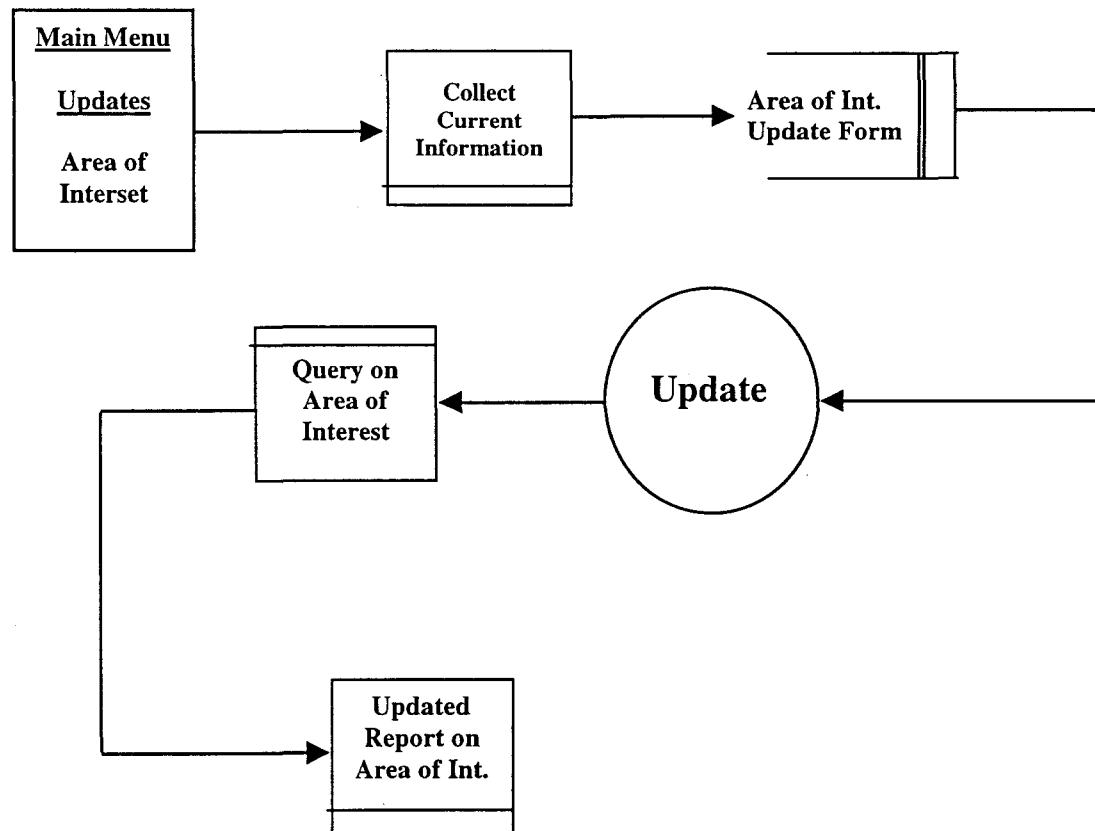
# Subject Updating



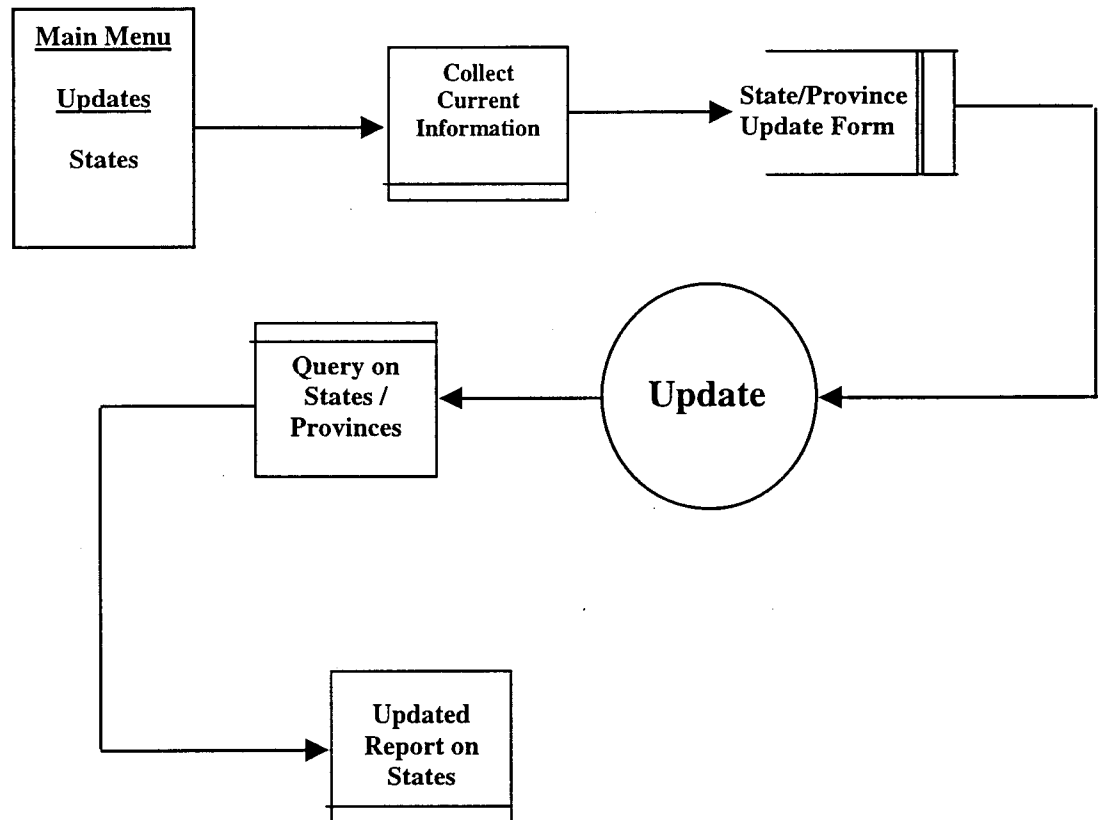
## Degree Updating

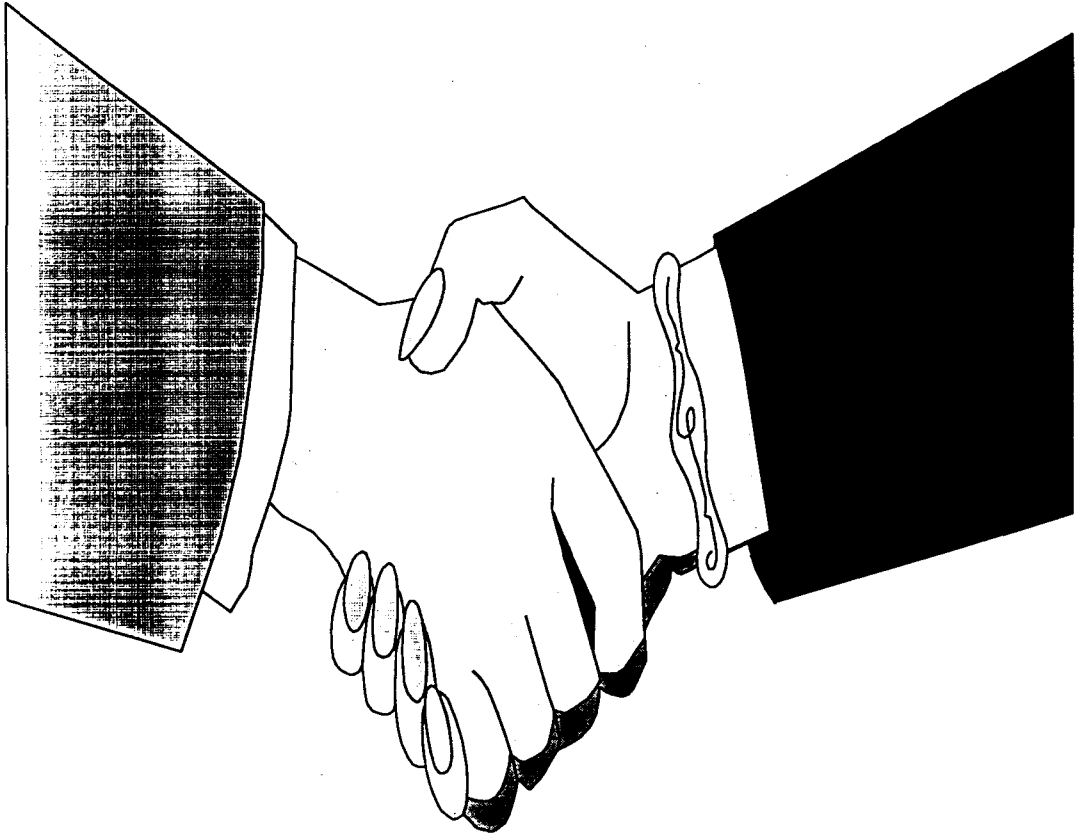


## Area of Interest Updating



## State / Province Updating





## **User Interfaces**



## 4.0 User Interfaces

### 4.1 Activities

This system will perform the following activities

- Store and Updating the Applications.
- Store and Maintaining the University / Institutes details.
- Store and Maintaining the State (provinces) of India.
- Selection of Candidates for the Written Test.
- Selection of Candidates for the Interview.
- Selection of Candidates for the Programme.
- Mails and Label generations
- Report generations / Execution of Queries.

### 4.2 Forms

#### 4.2.1 Application

##### Description

When a student submits his filled in application to the Institute the entry operator should enter the details that are filled in the computer data entry sheet of the application in the computer data entry form of the system. The entered data will be stored in the table APPLN.

**Inputs**

- Application Number
- Last Name and First Name
- Address
- Date of Birth and Sex
- Final Degree, University and Year of Passing
- Final and Aggregate Percentage
- Is he a Employee, Employer
- Is he a Summer Student, UGC-CSIR, Gate Candidate
- Recommendations Requested from
- Area of Interest
- Come to Know

**Process**

Depending on the activity to be performed (Add / Delete / Modify)

- Accept Details
- Validate Entries if required
- Read the date of Birth and Calculate Age
- Set the Recommendations Received to NO.
- If Final and Aggregate percentages are zero set it to zero.
- Update Database

**Outputs**

Messages if there is any blank entries in the computer data entry sheet.

Error Messages.

#### 4.2.2 Recommendations Received

##### Description

When the Recommendation letters from the professors from the candidate has requested reaches RRI that particular candidates Application form should be updated by specifying yes against the professors name in the Recommendations Received form. Which may help the candidate in getting a chance to write the test or n taking the Interview.

##### Inputs

- Application Number
- Yes / No against the Name of the Professors

##### Process

- Update the Database

##### Outputs

Messages indicating the Updation

Error Messages

#### 4.2.3 Zero List Update Form

##### Description

Some candidates might have not filled up their final percentage or Aggregate percentage in that case RRI will take care of those candidates. It is going to take a report on those

candidates who have not filled their final / Aggregate percentage of marks and those will be filled correctly in the Zero List Update Form.

**Inputs**

- Application Number
- Final Percentage
- Aggregate Percentage

**Process**

- Accept Details
- Update Database

**Outputs**

Messages indicating the Updation

Error Messages

#### 4.2.4 Miscellaneous Information Form

**Description**

This form is used to enter only when there is any kind of special entry is there regarding a candidate. This is optional for all the candidates.

**Inputs**

- Application Number
- Miscellaneous Information

## Outputs

Messages indicating the Updation

Error Messages

### 4.2.5 Selection To Test Form

#### Description

When all the steps are taken properly according to the order and when it is time to select the candidates to test then they have to use Selection Test Form. This will select the candidates according to the constraints provided in this form.

#### Inputs

- Cut off Final Percentage
- Cut off Aggregate Percentage
- University Grade
- Number of Candidates to be Selected

#### Process

- Selects the desired number of candidates for test
- Updates the Status flag of all the candidates who have been selected for test
- Updates selected to test table

**Outputs**

- View of the Currently Selected Candidates
- Messages indicating the Updation
- Error Messages

**4.2.6 Manual Test Selection Entry Form****Description**

Once the candidates have been selected for the test then the Institute will go through the reports on the candidates who have passed GATE, the candidates who are fellows of UGC-CSIR, the candidates were the Summer Students of RRI and it goes through the Recommended Professors. If the Institute wishes to give the chance to any of these candidates then this can be done by Authorized user by entering that candidates details in the Manual Test Selection Entry Form.

**Inputs**

- Application Number

**Process**

- Selects the desired candidate for test
- Updates the Status flag of the candidate who have been selected for test
- Updates selected to test table

**Outputs**

- View of the Currently Selected Candidates
- Messages indicating the Updation
- Error Messages

**4.2.7 Test Marks Entry Form****Description**

Once the Written test is conducted the marks scored by each candidate should be entered in the Test Marks Entry Form for further process in the selection procedure.

**Inputs**

- Application Number
- Date of Test Conducted
- Marks Scored in Test

**Process**

- Updates the Status flag of the candidate who has attended for test
- Updates marks scored in test and date of test conducted in APPLN table

**Outputs**

- Messages indicating the Updation
- Error Messages

#### 4.2.8 Selection To Interview Form

##### Description

When the written test is over and the candidate's test marks are entered in the Test Marks Entry Form and when it is time to select the candidates to *Interview* then they have to use Selection Interview Form. This will select the candidates according to the constraints provided in this form.

##### Inputs

- Cut off Marks in Test
- Number of Candidates to be Selected

##### Process

- Selects the desired number of candidates for Interview
- Updates the Status flag of all the candidates who have been selected for Interview
- Updates selected to Interview table

##### Outputs

- View of the Currently Selected Candidates
- Messages indicating the Updation
- Error Messages

#### 4.2.9 Manual Interview Selection Entry Form

##### Description

Once the candidates have been selected for the Interview then the Institute will go through the reports on the candidates who have passed GATE, the candidates who are



fellows of UGC-CSIR, the candidates were the Summer Students of RRI and it goes through the Recommended Professors. If the Institute wishes to give the chance to any of these candidates then this can be done by Authorized user by entering that candidates details in the Manual Interview Selection Entry Form.

**Inputs**

- Application Number

**Process**

- Selects the desired candidate for Interview
- Updates the Status flag of the candidate who have been selected for Interview
- Updates selected to Interview table

**Outputs**

- Messages indicating the Updation
- Error Messages

**4.2.10 Interview Marks Entry Form****Description**

Once the Interview is conducted the marks scored by each candidate should be entered in the Interview Marks Entry Form for further process in the selection procedure.

**Inputs**

- Application Number
- Marks Scored in Interview

**Process**

- Updates the Status flag of the candidate who has attended for Interview
- Updates marks scored in Interview in APPLN table

**Outputs**

- Messages indicating the Updation
- Error Messages

**4.2.11 Final Selection Entry Form****Description**

Once the Interview is over Based on the performances of the candidates in the interview and their area of interest and the seats available in the Institute the candidates will be selected. These selections are done manually candidates and it should be entered in the Final Selection Entry Form so that keep all the information updated.

**Inputs**

- Application Number
- Area of Research Alloted

**Process**

- Updates the Status flag of the candidate who has been selected

**Outputs**

- Messages indicating the Updation
- Error Messages

**4.2.12 University / Institute Master Form****Description**

This is the form to update the University / Institutes. If any information regarding University / Institute has to updated then they have to use University / Institute Master Form.

**Inputs**

Depending on the choice of activity (Add / Modify / Delete)

- University / Institute's Name
- University Rating According to RRI

**Process**

- If the choice was Add then a University Code will be generated for it
- Accept Details
- Validate all Entries
- Update UNITY table

**Outputs**

- Messages indicating the Updation
- Error Messages

#### 4.2.13 State (Provinces) Master Form

##### Description

This is the form to update the States (Provinces) of India. If any information regarding State (Province) has to be updated then they have to use States (Provinces) Master Form.

##### Inputs

Depending on the choice of activity (Add / Modify / Delete)

- States (Provinces) Name

##### Process

- If the choice was Add then a States (Provinces) Code will be generated for it
- Accept Details
- Validate all Entries
- Update STATE table

##### Outputs

- Messages indicating the Update
- Error Messages

#### 4.2.14 Subject Master Form

##### Description

This is the form to update the Subject studied in their Final Degree. This is actually the list of degrees with Major Subjects allowed to take admissions at RRI for Ph.D. Programme. If

any information regarding Subjects has to updated then they have to use Subject Master Form.

**Inputs**

Depending on the choice of activity (Add / Modify / Delete)

- Subject Name

**Process**

- If the choice was Add then a Subject Code will be generated for it
- Accept Details
- Validate all Entries
- Update SUBJECT table

**Outputs**

- Messages indicating the Updation
- Error Messages

**4.2.15 Degrees Master Form****Description**

This is the form to update the Degrees studied as their Final Degree. This is actually the list of degrees which are allowed to take admissions at RRI for Ph.D. Programme. If any information regarding Degrees has to updated then they have to use Subject Master Form.

**Inputs**

Depending on the choice of activity (Add / Modify / Delete)

- Degree Name

**Process**

- If the choice was Add then a Degree Code will be generated for it
- Accept Details
- Validate all Entries
- Update DEGREE table

**Outputs**

- Messages indicating the Updation
- Error Messages

**4.3 Reports**

**University Grade Report:** This Report will be taken to know the list of Universities and the grade to which each University belongs. The main intention of taking this report is to check out whether each university has been graded or not and to know the grade i.e. is given to a University is proper or not. This report is the most necessary report because the whole selection procedure is mainly depending on this report, the other reports are will support the normal procedure.

**State Report:** This Report will be taken to know the states that are present and going through this, if there is any kind of changes in the list of states that can be performed with the state entry form.

**Degree Report:** This Report will be taken to know the list of degrees (i.e. the candidate's degrees) which are all eligible to get admission or to apply.

**Area of Interest Report:** This Report will give the list of permutation of offered courses in RRI according to candidate's preferences. By going through this report if there is any addition or deletion of the Area of interest can be performed.

**Zero List Report:** This report will be taken before the actual selection of candidates for written test is going to be done. This will Show all the candidates who have not filled up their final percentage / Aggregate Percentage in the application form. With the help of this report these candidates final and aggregate percentage can be filled using the zero list update form.

**UGC-CSIR Report:** This report will be used during the selection of candidates for the selection to test and for the interview. This report will show all the candidates who are all the fellows of UGC-CSIR. Institute sometimes considers these candidates are eligible to take test / interview rather than just the conditions that they have applied to other candidates.

**GATE Report:** This report will be used during the selection of candidates for the selection to test and for the interview. This report will show all the candidates who are all passed out their GATE exams. Institute sometimes considers these candidates are eligible to take test / interview rather than just the conditions that they have applied to other candidates for selection.

**Summer Student Report:** This report will be used during the selection of candidates for the selection to test and for the interview. This report will show all the candidates who were all the Summer Students at RRI. Institute sometimes considers these candidates are eligible to take test / interview rather than just the conditions that they have applied to other candidates for selection.

**Recommendation Report:** This report will be used during the selection of candidates for the selection to test and for the interview. This report will show all the candidates who are all recommended by which professors. Institute sometimes considers some of the candidates who are recommended by some very famous professors are eligible to take test / interview rather than just the conditions that they have applied to other candidates for selection.

Some of the other reports that are generated are

- State Wise Reports
  - 1 Number of Applications Received
  - 2 Number of Candidates Selected to Test
  - 3 Number of Candidates Attended the Test
  - 4 Number of Candidates Qualified for Interview
  - 5 Number of Candidates Attended Interview
  - 6 Number of Candidates got Selected
  
- Reports on
  - 1 Number of Applications Received
  - 2 Number of Candidates Selected to Test
  - 3 Number of Candidates Attended the Test
  - 4 Number of Candidates Qualified for Interview
  - 5 Number of Candidates Attended Interview
  - 6 Number of Candidates got Selected



#### 4.4 Mails and Labels

The people who are all selected for the written test should be intimated. For this the system is going to generate the call letters for all those candidates who have been selected for the written test. The letters will be generated on zone wise considerations so that each zone candidates will have their exams on the same day. Along with these letters to the individual candidate corresponding labels will also be generated for all these candidates so that it will be easier for posting.

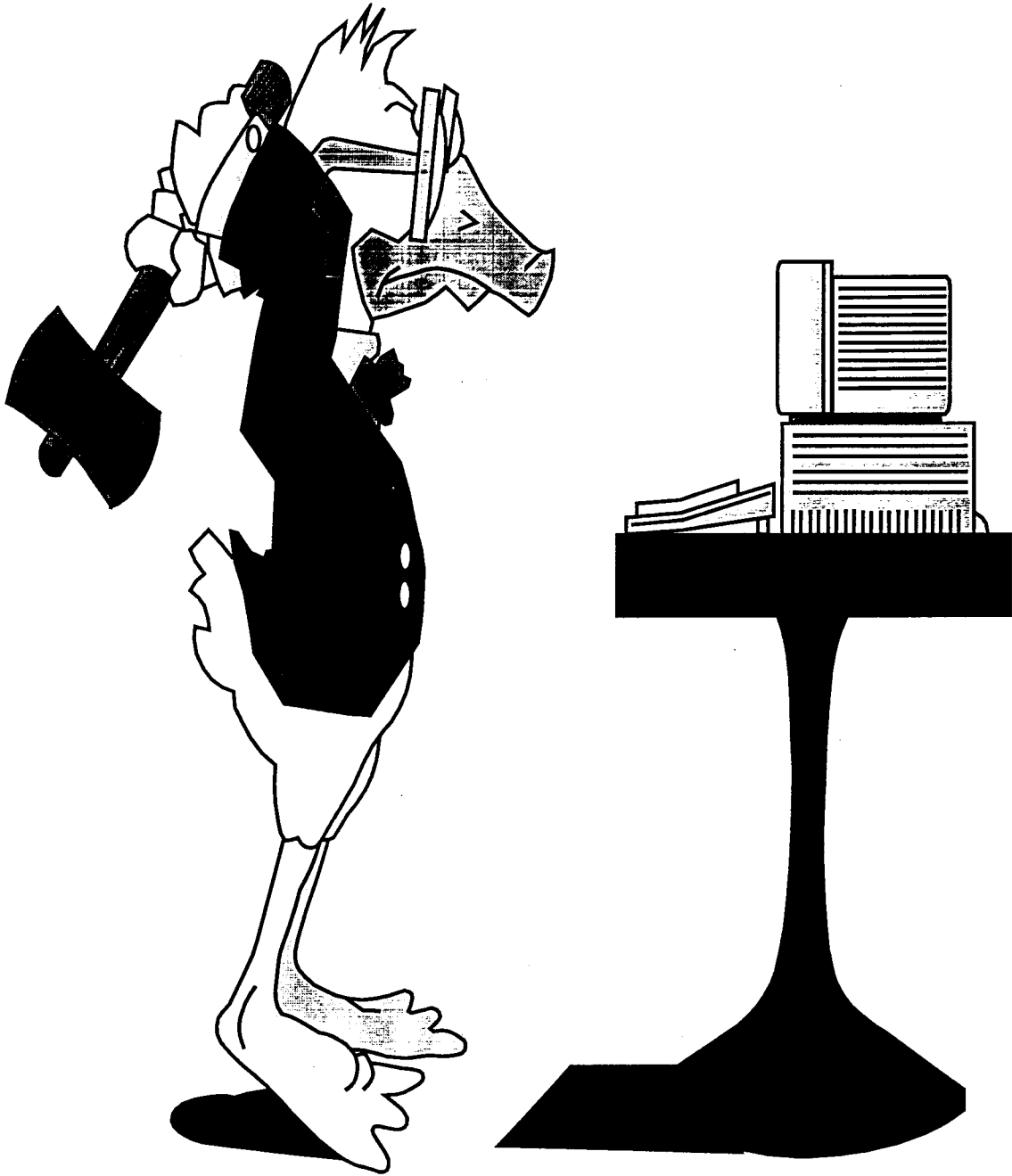
The people who have got selected in the RRI for the Ph.D. programme all these people have to intimated. For this the system is going to generate the offer letter for all those candidates who have been selected. Along with these letters to the individual candidate corresponding labels will also be generated for all these candidates so that it will be easier for posting.

#### 4.5 Queries

The main Queries are of the system are to select the candidates for the test and the interview. The system is also provided with the queries like candidates applied state/ province wise or university wise.

#### 4.6 Security

- System should be used by only the Authorized users for this as soon as the system is started it is going to ask for the user name and password.
- Only one person can called as administrator can provide authority to others to use the system.
- Person with main authority (administrator) can only use manual selection for test and Interview.



# Testing Procedure

## 5.0 Testing Procedure

### 5.1 TEST SPECIFICATIONS

The objectives of the proposed system are to perform the functions listed below.

- Accept, Update and the Applications
- Store and Maintain the Applications
- Update and Maintain University details
- Update and Maintain the State details
- Update and Maintain Courses
- Update and Maintain Users
- Update and Maintain Eligibility
- Automated Selection to Test Based on Queries
- Manual Selection to Test Based on some Criteria
- Automated Selection to Interview Based on Queries
- Manual Selection to Interview Based on some Criteria
- Manual Selection to Offer the Course based on Availability
- Generation of Mails and Labels for selected candidates
- Report generation and Execution of Queries

## 5.2 Testing and its Results

The tests have been made on each form for its correctness of accepting the data and storing the data into the respective tables in the desired form of data type. The main objective and the concentration of the testing was on the selection procedure algorithm for written test and for the Interview. These algorithm were tested with the test data first and then these were tested with the last years data and have been compared with the results the of the last years data. The test were made for all types constraints. The tests were done in presence of the user so that he can get some familiarity with the system that is going to be introduced for the later years. During the testing each objective of the system has been tested and found to be working correct. The reports produced by the system has been compared with the last years reports and these were found to be correct.



## Conclusions

## 6.0 Conclusions

This package is user friendly system, which can be utilized with the basic knowledge of the Data Entry functions. The package has been developed as extremely interactive in order to avoid confusion and also to encourage correct and accurate processing of data.

The following factors, which are most important for the success of a project, have been taken care of:

- ◆ Fully Menu driven
- ◆ User Specific Menus
- ◆ Uniform and User Friendly Screens
- ◆ Entry time data validation
- ◆ User Confirmation after data entry before update
- ◆ Reports available in different modes (view, file, print..)
- ◆ Queries of all possible types.
- ◆ Automated procedures.

**6.1 Future enhancements:** Addition of any new modules like downloading the applications from the Raman Research Institute's Home page and applications can be collected either on the web or through posts can also be implemented.

## 6.2 Assumptions and Dependencies

- The Operator himself crosschecks the Data entry done by him.
- The data provided by the student while submitting his application is true.



## Appendix

## 7.0 Appendix

### 7.1 System Specification

#### Development Environment

Hardware: Ast Bravo LC 5133 / 64 MB RAM / 4GB Hard disk

Software: Windows 95 / Visual Basic 5.0(Enterprise)

Tools: Visual Basic 5.0 as front end with MS-Access 97 as Back end and MS-WORD 97.

#### Operating Environment specification:

Hardware: 486 Machine /16 MB RAM / 500 MB Hard disk

Software: MS-Access as Backend with Windows 95 Operating System and MS-WORD 97.



DataEntry MasterUpdate Selction ReportsforSelection MailsandLabels Reports Help Exit

# **RAMAN RESEARCH INSTITUTE**

**C. V. Raman Avenue, Sadashivanagar, Bangalore - 560 080.**



## **Ph. D. Programme Selection Process**



APP\_NO: 3530

# RAMAN RESEARCH INSTITUTE Ph.D. Programme COMPUTER DATA ENTRY SHEET

First Name	VINAY DEEPAK S	Surname	HANDHIGANADU
Address	486, 75 'D' CROSS, 10 'F' MAIN RAJAJINAGAR, VI BLOCK BANGALORE		
Date of Birth	5/13/74	Age	24
Final Degree	XXXX	Sex	M
University/Institute	102	State	ANDHRA PRADESH
Year of Passing	1998	Pin Code	560010
Final Percentage	61.4	Subject	Physics
Recommendations Requested from	Career Percentage 54.17		
1. >	DR. B.A. KAGALI	2. >	DR. RAMANI
Summer Student at RRI?	Y	Guide's Name	B.R. IYER
Employed?	N	Name of the Company	
UGC - CSIR Fellowship?	N	Gate Score	0.00
Field of Interest	AAP	Come to Know	NEWS PAPER

Add	Modify	Delete	Find	Save	Cancel	EXIT
First	Prev	Next	Last	Search	OK	

**RAMAN RESEARCH INSTITUTE Ph.D. Programme  
Recommendation Letters Received Entry From**

Application NO.

First Name

Sur-Name

Recommendations Requested From Received :

1.>

2.>

Search	Save	Cancel	OK	EXIT
First	Prev	Next	Last	

**RAMAN RESEARCH INSTITUTE Ph.D. Programme  
Miscellaneous Information Entry Sheet**

Application NO. 3530  
First Name VINAY DEEPAK S  
Sur - Name HANDHIGANADU  
Information 1  
Information 2  
Information 3  
Information 4

Search	Save	Cancel	OK	EXIT
First	Prev	Next	Last	

**RAMAN RESEARCH INSTITUTE Ph.D. Programme  
Final Marks Zero Entry Correction Form**

Application NO.

Label3

First Name

Label4

Sur - Name

Label5

Final Percentage

Career Percentage

<u>S</u> earch	<u>S</u> ave	<u>C</u> ancel	<u>O</u> K	EXIT
<u>F</u> irst	<u>P</u> rev	<u>N</u> ext	<u>L</u> ast	



## RAMAN RESEARCH INSTITUTE Ph.D. Programme Selection of Candidates for the Test

Final Percentage

Career Percentage

University / Institute Rating

Number of People to be  
Selected from this Group

Select

View

Modify

OK

Add To Selection List

Exit

**RAMAN RESEARCH INSTITUTE Ph.D. Programme**  
**Update Entry Form : Selection to Written Test**

Application No.	<input type="text"/>
First Name	<input type="text"/>
Sur Name	<input type="text"/>
University Code	<input type="text"/>
Status Flag	<input type="text"/>
Final %	<input type="text"/>
Aggregate %	<input type="text"/>
Address	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
State	<input type="text"/>
Pin Code	<input type="text"/>

<input type="button" value="Add"/>	<input type="button" value="Save"/>	<input type="button" value="Cancel"/>	<input type="button" value="EXIT"/>
------------------------------------	-------------------------------------	---------------------------------------	-------------------------------------

**RAMAN RESEARCH INSTITUTE Ph.D. Programme**  
**Test Marks Entry Form**

Application NO. 3530

First Name VINAY DEEPAK S

Sur - Name HANDHIGANADU

Test Date: 10/12/98

Mark Scored in Exam 0.00

Search	Save	Cancel	OK	EXIT
First	Prev	Next	Last	





## RAMAN RESEARCH INSTITUTE Ph.D. Programme Selection of Candidates for the Interview

Cut Off Marks in Written Test

Number of People to be  
Selected for the Interview

Select	View	Modify	OK
Add To Selction List			Exit



## RAMAN RESEARCH INSTITUTE Ph.D. Programme Update Entry Form : Selection to Interview

Application No.	<input type="text"/>
First Name	<input type="text"/>
Sur Name	<input type="text"/>
University Code	<input type="text"/>
Status Flag	<input type="text"/>
Final %	<input type="text"/>
Aggregate %	<input type="text"/>
Address	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
State	<input type="text"/>
Pin Code	<input type="text"/>

<input type="button" value="Add"/>	<input type="button" value="Save"/>	<input type="button" value="Cancel"/>	<input type="button" value="EXIT"/>
------------------------------------	-------------------------------------	---------------------------------------	-------------------------------------

**RAMAN RESEARCH INSTITUTE Ph.D. Programme  
Interview Marks Entry Form**

Application NO.

3530

First Name

MINAY DEEPAK S

Sur - Name

HANDHIGANADU

Test Date

10/12/98

Mark Scored in Exam

Mark Scored in Interview

Search	Save	Cancel	OK	EXIT
First	Prev	Next	Last	



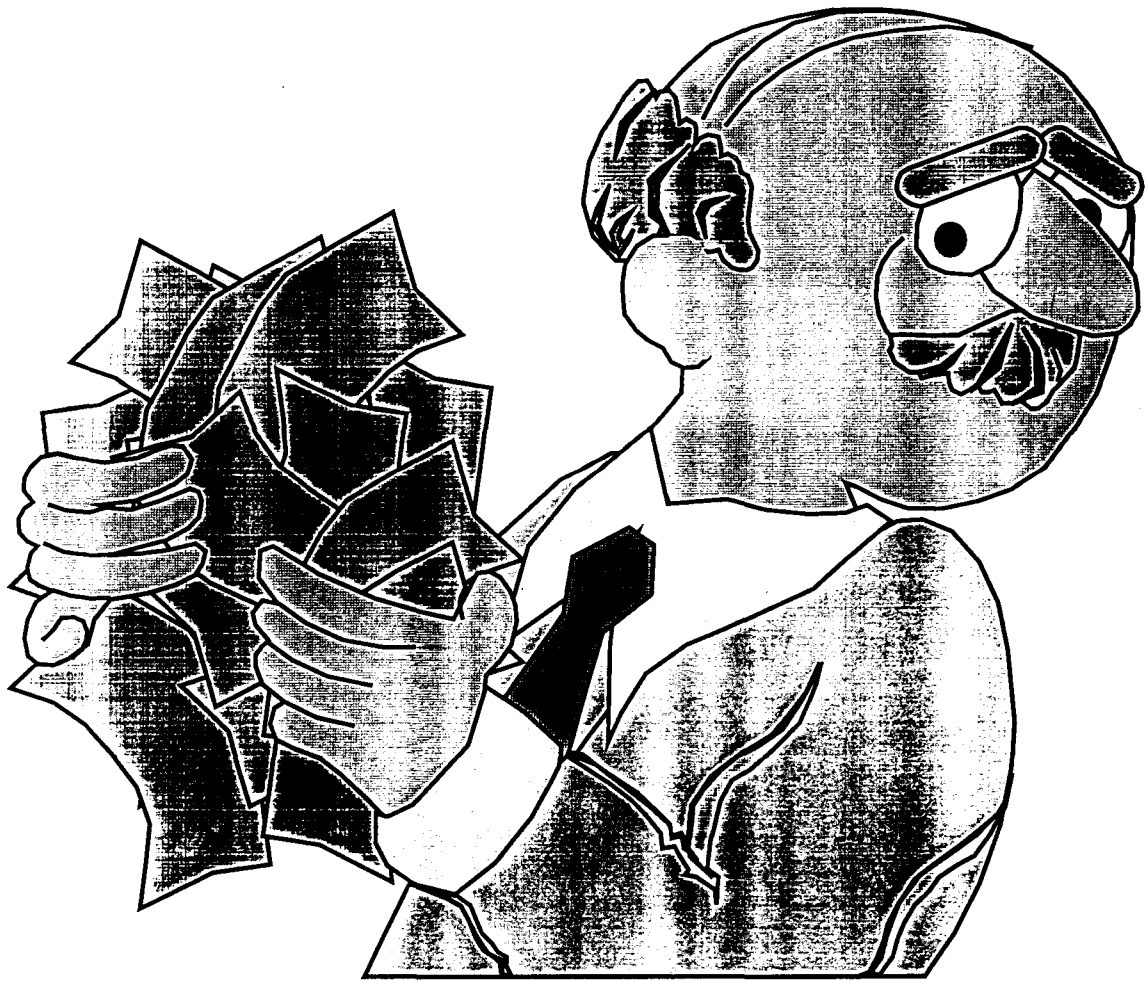
**RAMAN RESEARCH INSTITUTE Ph.D. Programme**  
**List of Candidates Who's Final % Entry is Zero**

**To Display**

**To File**

**To Printer**

**Exit**



# Biblio Graphy

## 8.0 Bibliography

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2. Introduction to Database Systems, C.J. DATE
3. Software Engineering - A Practitioners Approach, Roger Pressman.
4. Visual Basic 5.0 in 21 days.

### Websites:

[WWW.MCP.COM](http://WWW.MCP.COM)

[WWW.ALTAVISTA.COM/GUIDES](http://WWW.ALTAVISTA.COM/GUIDES)

[WWW.YAHOO.COM/SOFTWARE](http://WWW.YAHOO.COM/SOFTWARE)

**Database  
Management  
And  
Active Web Page  
Design**

## **1.0 ORGANISATION PROFILE**

### **ASTRONOMICAL SOCIETY OF INDIA**

The Astronomical Society of India was established in 1972 and in the past twenty-five years has grown to become the prime association of professional astronomers in India with more than 500 members. The objective of the society is the promotion of Astronomy and related branches of science in India. The society organizes scientific meetings, publishes a quarterly bulletin and supports the popularization of Astronomy and other similar activities.

The Society shall be called the Astronomical Society of India, or Bharatiya Jyotirvignyana Parishad hereinafter referred to as the 'Society' or 'Parishad'. The registered office of the Society shall be located in Hyderabad, Andhra Pradesh and until otherwise determined shall be situated at Department of Astronomy, Osmania University, Hyderabad - 560 007.

#### **Objectives of the Society**

The object of the Society shall be the promotion of Astronomy and related branches of science in India. The functions of this Society in pursuance of this object shall be:

- (i) To encourage the study of all aspects of Astronomy and Astrophysics.



(ii) To issue such publications (e.g., Bulletin, Journal, Newsletter, etc.) from time to time, as may be decided upon by the Executive Council of the Society.

(iii) To hold scientific meetings for presentation of original papers, review talks, etc.

(iv) To popularize the science of Astronomy among the educational institutions and in the general public of India by

(a) Arranging lectures on Astronomy and Astrophysics

(b) Striving to include Astronomical courses in the School, College and University curricula

(c) Cooperating in conducting symposia, schools, etc.

(d) Encouraging amateur astronomers

(e) Taking up any other suitable activity.

(v) To express the views of the astronomical community regarding the current status and future developments of Astronomy in India.

(vi) To keep liaison with other Astronomical societies of the world.

(vii) To institute lectures, prizes and fellowships.

(viii) To collect astronomical material like books, slides, movies, journals, etc. and make them available to interested parties for study

and research at nominal cost and to the general public by way of exhibitions, etc.

(ix) To encourage coordinated research programmes among Indian Astronomers and exchange of research personnel between astronomical institutions and universities in India.

(x) To initiate and perform any other activities and functions which would further advance Astronomy and related sciences in India.

The business of the Society shall be controlled and conducted by an Executive Council hereinafter referred to as 'Council'. The functions and powers of the Council will be as laid down in the Rules and Regulations.

### **Bulletin of the Astronomical Society of India**

Bulletin of the Astronomical Society of India is a quarterly Journal published by the Astronomical Society of India. It appears in March, June, September and December. The Bulletin publishes original research papers, review articles, proceedings, reports on scientific meetings, book reviews, reports from astronomical centers and matters related to the Society.

### **Membership**

The Astronomical Society of India or Bharatiya Jyotirvignyana Parishad shall have the following categories of members

- ◆ **Regular members**
- ◆ **Associate members**
- ◆ **Student member**
- ◆ **Institutional members**
- ◆ **Donor members**
- ◆ **Honorary fellows**

The regular members shall form the General Body of the Society in which shall vest the primary authority in all the matters concerning the Society. The Society shall function through the General Body and through such Chapters as may be constituted by the general body from time to time. For the purposes of day to day administration of matters relating to the Society, the general body shall from time to time, elect from amongst its members an Executive Council hereinafter referred to as the Council, in such manner as hereinafter prescribed in these Rules and Regulations.

Admission to all categories of membership, other than Honorary fellowship, shall be made by the Council on consideration of applications for such membership. The secretary shall communicate the decision on an application within one month after the decision is taken. A newly admitted member must pay the admission fee and annual subscription within six months of admission to membership failing which his/her admission to membership shall stand cancelled.

The admission fee and annual subscriptions to the various categories of membership shall be fixed by the Council with a provision to alter the same if and when necessary.

The eligibility and procedure of admission for various categories of membership shall be as follows:

*(a) Regular members:* Any person who is capable of preparing an acceptable paper in some subject of Astronomy or related branch of science shall be eligible for a regular membership of the Society. An application for a Regular membership must be supported by two Regular members. A Regular member shall have the right to attend meetings of the General Body and to vote and shall be eligible to hold an elective office.

Only a Regular member of the Society may be admitted by the Council as a Life member on payment of such lumpsum amount as may be determined by the Council.

*(b) Associate members:* Any person interested in Astronomy who is not eligible to become a Regular member may be admitted as an Associate member provided his/her application for membership is supported by two Regular members. An Associate member may attend the meetings of the General Body, but shall have no right to vote or hold an elective office.

*(c) Student members:* Any person studying Astronomy or a related branch of science may be admitted as a Student member for such period until he/she becomes eligible for a regular membership or his/her age exceeds 26 years, whichever is earlier. An application for a Student membership should be supported by two regular members. A Student member shall have no right to attend the business meetings of the General body or to vote or to hold an elective office.

(d) *Institutional members:* Observatories, Research Institutions, Educational Institutions and Commercial or Industrial organizations associated with Astronomy or related branches of science would be eligible for admission as Institutional members. They shall be entitled to send one representative to the meetings of the General Body who shall not have the right to vote or to hold an elective office.

(e) *Donor members:* Any person who donates a sum specified by the Council under the provision of Rule 2 above, to the Society may be admitted as a Donor member. Such a member shall have all privileges of a Regular member except the right to vote or hold an elective office.

(f) *Honorary fellows:* Upon nomination by not less than five Regular members, the Council may elect distinguished astronomers as Honorary fellows who shall have all the privileges of regular membership without payment of any dues. Only one Honorary fellow may be elected in any one year and the total number of honorary fellows shall not exceed ten at any given time.



**Introduction**

## 2.0 Introduction

### 2.1 Internet

The Internet had its roots during the 1960's as a project of the United States government's Department of Defense, to create a non-centralized network designed to survive partial outages (i.e. nuclear war) and still function when parts of the network were down or destroyed. This project was called ARPANET (Advanced Research Projects Agency Network), created by the Pentagon's Advanced Research Projects Agency established in 1969 to provide a secure and survivable communications network for organizations engaged in defense-related research.

In order to make the network more global a new sophisticated and standard protocol was needed. They developed IP (Internet Protocol) technology, which defined how electronic messages were packaged, addressed, and sent over the network. The standard protocol was invented in 1977 and was called TCP/IP (Transmission Control Protocol/Internet Protocol). TCP/IP allowed users to link various branches of other complex networks directly to the ARPANet, which soon came to be called the Internet.

Researchers and academics in other fields began to make use of the network, and eventually the National Science Foundation (NSF), which had created a similar and parallel network called NSFNet, took over much of the TCP/IP technology from ARPANET and established a distributed network of networks capable of handling far greater traffic.

ARPANet grew during the 1970's, and was upgraded to a high-speed network by linking several powerful supercomputer stations called nodes.

In 1985, the National Science Foundation (NSF) began a program to establish Internet access across the United States. They created a backbone called the NSFNET and opened

their doors to all-educational facilities, academic researchers, government agencies, and international research organizations. ARPANet was shut down by the Defense Communications Agency in 1989 due to limited funding and support from the military.

By the 1990's the Internet experienced explosive growth. It is estimated that the number of computers connected to the Internet was doubling every year. By mid-1994 the Internet connected an estimated two million computers in more than 100 countries, serving some 23 million users. Many commercial computer network and data services also provided at least indirect connection to the Internet. It was also estimated that at this rapid growth everyone in the world would have an e-mail address by the year 2000.

### **2.1.1 The Intranet**

"The Internet" is quite a different thing from "an Intranet". An Intranet is a mini web that is limited to the users, machines, and software programs of a specific organization, usually a company. Since organizations are typically small and have more control over policies and information systems, Intranets are often more controllable.

### **2.1.2 Internet Services**

Aside from being hypertext-based and capable of transferring a number of multimedia file formats, the Web is unique in its ability to access other Internet services. Being the youngest of the Internet services, the Web can access all of its older sub links, including Internet e-mail, Usenet newsgroups, Gopher servers, and FTP servers. Before we can access these services, though, we need to know what they do and how their addressing schemes work.

### **2.1.3 Internet E - Mail**

Internet e-mail is designed for the transmission of ASCII text messages from one Internet user to another, specified user. Like mail delivered by the U.S. Post Office, Internet e-mail allows you to address your messages to a particular person. When sent, it eventually



arrives in that person's e-mail box (generally an Internet-connected computer where he or she has an account) and your recipient can read, forward, or reply to the message.

Internet e-mail addresses follow a certain convention, as follows:

**username@host.sub-domain.domain.first-level domain**

Where username is the name of the account with the computer, host is the name of the computer that provides the Internet account, sub-domain is an optional internal designation, domain is the name assigned to the host organization's Internet presence, and first-level domain is the two- or three-letter code that identifies the type of organization that controls the host computer.

## **2.2 The World Wide Web**

The World Wide Web is a global collection of interconnected documents on the Internet. Because the World Wide Web has grown explosively and has been advertised so extensively, many people think it is the same thing as the Internet. However, the World Wide Web is only a part of the Internet.

The Internet has been around for over three decades. It began as a Department of Defense program for enabling computers to communicate over great distances without requiring a central server to route the communications traffic. Since those early days, the Internet has grown substantially. Early on it was adopted by the academic community, and more recently it has been commercialized. The federal government no longer funds the Internet directly; leaving private and public telecommunications companies in charge of the major backbones-the major network connections of the Internet. The telecommunications companies charge Internet service providers for connections to the backbone, and Internet service providers in turn charge companies and individuals for their access to the Internet. The Internet itself is nothing more than an enormous number of networked computers all over the world. Like any computer network, the Internet has

various software programs running on it, such as e-mail, newsgroups, FTP, gopher, and the World Wide Web.

The World Wide Web, or Web, was born in 1989 at CERN (the European Laboratory for Particle Physics). Since then, it has grown at a phenomenal rate. Today, Web traffic accounts for somewhere between one third and one half of the total traffic on the Internet. Because the Internet consists of many other sources of traffic, many of which have been around for decades, this is an impressive feat. So, what is the Web? In simple terms, the Web is a part of the Internet that uses the Hypertext Transfer Protocol (HTTP) to display hypertext and images in a graphical environment. Hypertext refers to the ability to present text documents that are interlinked. You might click on a portion of the text in a document and be taken to another section of text in a different document. The Web is based on the concept of hypermedia, which is a superset of hypertext. Think of hypermedia as various forms of media (text, graphics, sound files, and so on) that are interlinked.

In the early days of the Web, text links always had a different color of underlined text, and graphic links were always enclosed within a colored box. Now, however, the current shape of the mouse pointer gives you a better indication of what is and isn't a link. If the mouse pointer changes into a hand with the index finger extended the object being pointed to be a link to another document. Documents on the Web are interlinked so one can navigate between them by selecting links. The name World Wide Web alludes to the Web's spiderweb-like nature.

### **2.3 Clients and Servers**

To understand the World Wide Web and CGI programming, one must understand the division between Web clients and Web servers and how HTTP facilitates the interaction between the two. Simply put, a server handles requests from various clients. For example, suppose you are using a word processing program to edit files on another computer. Your computer would be the client because it is requesting the file from another computer. The

other computer would be the server because it is handling your computer's request. With networked computers, clients and servers are very common. A server typically runs on a different machine than the client, although this is not always the case. The interaction between the two usually begins on the client side. The client software requests an object or transaction from the server software, which either handles the request or denies it. If the request is handled, the object is sent back to the client software. On the World Wide Web, servers are known as Web servers, and clients are known as Web browsers. Web browsers request documents from Web servers, allowing you to view documents on the World Wide Web. There's a good chance that you have already used a Web browser. Some of the most common browsers are Netscape's Navigator, Microsoft's Internet Explorer, and NCSA's Mosaic. Like most software companies that distribute web browsers, these companies also distribute Web server software.

The process of viewing a document on the Web starts when a Web browser sends a request to a Web server. The Web browser sends details about itself and the file it is requesting to the Web server in HTTP request headers. The Web server receives and reviews the HTTP request headers for any relevant information, such as the name of the file being requested, and sends back the file with HTTP response headers. The Web browser then uses the HTTP response headers to determine how to display the file or data being returned by the Web server.

When a Web browser requests a CGI script from a Web server, the server starts the CGI script and passes the HTTP request headers to it. The information stored in the request headers is available for your script to use. Normally, when a CGI script is finished executing, the output is passed back to the Web server, which formats an HTTP response header and sends the information to the Web browser. It is possible, however, for your CGI script to format the HTTP response header and send the data directly to the Web browser. You can use this approach to reduce the workload of your Web server.

Whether the Web browser is requesting a file or a CGI script, the browser has to know the location of the Web server and the name of the file in order to make the request. With

the millions of documents on the Web, you might wonder how the Web browser knows exactly where to look for the file you want to see. You probably also realize that many files on the Web have the exact same name. So how do the Web browsers get the correct document? Each file on the Web has a unique identifier that not only sets it apart from other documents but also describes where it is located. These unique identifiers are called uniform resource locators, or URLs.

## 2.4 Uniform Resource Locators

The uniform resource locator (URL) is like an address for Web documents. Every document on the Web has a unique URL, and each part of the URL provides specific information about the location of the document it addresses. Here are some examples of URLs:

`http://www.thepalace.com/palace-faq.html`

`http://www.yahoo.com`

`http://www.thepalace.com/cgi-bin/directory.pl`

`ftp://ftp4.netscape.com/pub/MacJavaB1/Mac2.0JavaB1.hqx`

Each URL has three basic parts: the protocol, the server machine, and the file being requested. The protocol is everything up to the colon and the first two slashes. The protocol for the first three of the preceding examples is http (hypertext transfer protocol) and the protocol for the last one is ftp (file transfer protocol). For a Web browser, the most common protocols are `http://`, `ftp://`, `gopher://`, and `news://`.

Following the protocol, between the double slashes and the first single slash, is the name of the machine you want to access. This name can be either the domain name of the machine, as in all of the examples, or the IP address. Just as every document on the Internet has a unique identifier, every machine on the Internet must also. This identifier is a number known as the IP (Internet Protocol) address. An example of an IP address is 206.17.52.2. Because names are easier for people to remember than numbers, IP address

can be aliased to domain names. For example, the domain name `www.thepalace.com` points to the machine with the IP address `206.17.52.2`. Sometimes you may see a colon and a number following the machine name, as in `www.abletree.com: 8080`. This means that the server you are accessing on the `www.abletree.com` machine is using the port `8080` instead of the default port, which for Web servers is port `80`.

After the protocol and the name of the server machine, the URL contains the name of the file being requested. This name often includes subdirectories on the server machine. If no subdirectories are included, the server looks in the document root, which it believes to be the highest-level directory. In the first example URL, the file `palace-faq.html` is in the document root on the `www.thepalace.com` machine. The fourth example is the address for a file called `Mac2.0JavaB1.hqx` in the `pub/MacJavaB1` subdirectory of the `ftp4.netscape.com` machine. The second and third examples illustrate special occurrences of URLs. The second example, `http://www.yahoo.com`, does not specify a file to retrieve. Most of the time, when no file is specified, the Web server automatically looks for a file called `index.html` and returns that file. If `index.html` does not exist, the Web server returns a list of files contained in that directory, which in this example is the document root. Many Web servers also allow you to specify a default file to return for URLs formatted in this manner. This default file you specify can be a CGI script, which gives you a great deal of control over what documents are available to certain Web browsers and Internet domains. The third example, `http://www.thepalace.com/cgi-bin/directory.pl`, looks like the first and fourth example, but with one key difference. The directory `cgi-bin` does not have to be a subdirectory of the document root. Most Web servers allow you to specify a location for the `cgi-bin` directory, which is outside of the document root. Also, when a Web server receives a request for a file contained in the subdirectory `cgi-bin`, it knows that the file is a CGI script and will run it and return only the output from the script.

So, each document on the Web has a unique URL, but what are these documents? Well, they can actually be any kind of file, such as graphic images, executable programs, text files, word processor documents, and spreadsheets. Any file can be sent by a Web server.

However, only a limited number of file types can be displayed in a Web browser. Text, GIF images, and JPEG images are the only files that most Web browsers can display. If a Web server sends a file that the browser cannot display, the user can either start a helper application to display the file or save the file to the hard drive. Most of the documents you encounter on the Web will be text files containing HTML.

## 2.5 CGI

The Common Gateway Interface, or CGI, is a standard for communication between Web documents and CGI scripts you write. CGI scripting, or programming, is the act of creating a program that adheres to this standard of communication. A CGI script is simply a program that in some way communicates with your Web documents. Web documents are any kind of file used on the Web. They can be HTML documents, text files, image files, or any number of other file formats. The existence of this gateway between programs you write and your Web documents allows you to create much more dynamic and interactive Web pages than you could with HTML alone.

CGI stands for Common Gateway Interface. As its name implies, it is a gateway between the Web server and your CGI script. It enables the CGI program that you write to receive input from and send output to a Web browser. You can write CGI programs in almost any programming language. If you already know how to program, CGI will be very easy for you to learn. To get started, you just need to know how data is passed back and forth between the Web server and your program. But because CGI is not a programming language, you need to know one to write CGI scripts.

Let's take a look at what is happening behind the scenes when you call this script from your browser. First, the browser sends an HTTP request for the first-one.pl file in the cgi-bin directory on the www.robertm.com machine. The Web server on the www.robertm.com machine receives the request and finds the file on the system. Because the request is for a document in the cgi-bin directory, the Web server knows that it is a

CGI script, and executes it. At this point, the script takes over. It executes its lines and sends the output, stdout in this case, to the Web server. The Web server receives the data and checks the header the CGI script returned. The headers tell the Web server that the data it received from the CGI script is just HTML or a graphic image. The Web server then forms an HTTP response header and sends the header and the CGI output to the Web browser that called it.

## 2.6 Dynamic Web Pages

Recall that the World Wide Web is divided into Web browsers and Web servers that use HTTP to communicate and that most Web pages are written in HTML. But HTML pages are always static. They do not change unless you edit the file and alter the contents. CGI, however, allows you to create very dynamic documents. A CGI script can draw from up-to-date information to form the Web page that is displayed in the browser. For example, you can use CGI to create documents that display current data such as the time, date, and number of accesses to that page. With HTML alone, it would be impossible to display this information in real time.

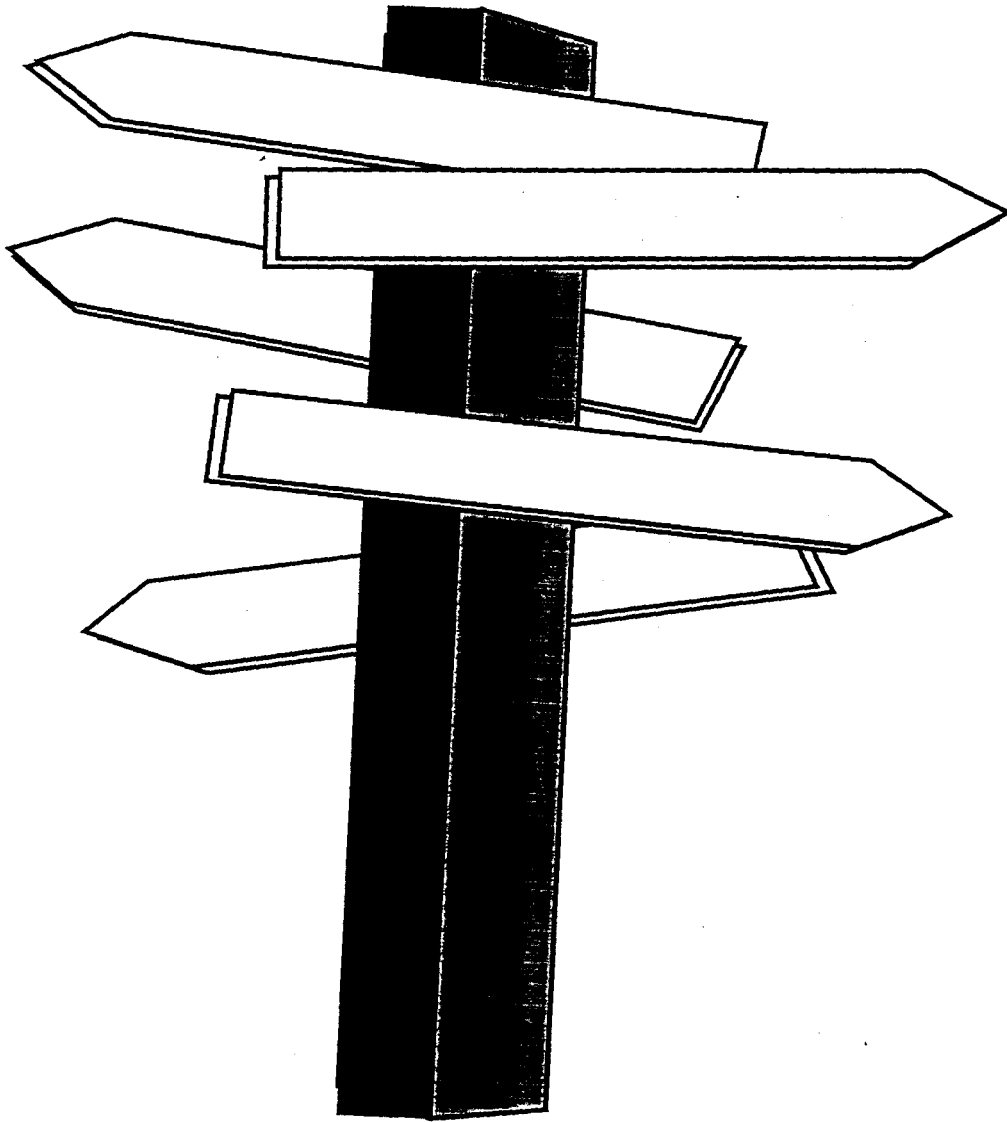
CGI can also interface with a database to make dynamic documents. If your database included a lot of information that you wanted to make accessible via the Web, it would be a laborious project to convert all of the data into HTML pages. Then, every time the data in your database changed, you would have to edit every HTML page containing the information that had changed. For a large database, this process would be very time consuming and error prone. There would also be limits on how the user could search through the data. Every possibility for search results would have to be an HTML page created and maintained by you. CGI makes this process much easier. All of the data can remain in your database, where you maintain it as you always have. When a user requests information from your database through the Web pages you create, your CGI script extracts the relevant data and displays it in the browser. You can even allow the user to change to the data by adding, deleting, or modifying records.

As mentioned, you can set up your Web server to use a CGI script for the default document returned to the user when just your domain name is entered as the URL. This approach allows you to send different documents depending on the type of browser being used or the domain, from which the request originated, giving you some control over which users see your data. You can also make a script return different data virtually every time it is called. In this way, your home page would always be different for all users, every time they accessed it.

## **2.7 Interactive Web Pages**

CGI scripts also provide a mechanism for making Web pages interactive. By using the <FORM> tag in HTML, you can receive data directly from the user who is viewing your Web pages. All of this data can be sent to a CGI script that can then act upon it. For example, you could create a simple navigation control for your entire Web site using a drop-down list containing the names of all the Web pages on your site. The user would simply select which page he or she wanted to view, and the CGI script would return it. Bulletin boards are another way you can use CGI to create interactive Web pages. You can write scripts that will display all of the messages posted so far and allow the user to post new messages. You could make the page very simple, with just a list of messages, or you could make it an Usenet-style message area, with replies to messages underneath the original posting. CGI lets you do all this and more. For the most part, the only limit is in your own ability to program. If the data you want to display can be formatted with HTML, you can output it from your CGI script.





## **Design Overview**

## 3.0 Design Overview

### 3.1 Existing System

Currently Astronomical Society of India has got its own web page. In this system there is nothing like database to maintain the details of the members. Here what ever the details about each member that is displayed on the web page are just the HTML file and the details are just the text. The detail about the members that is displayed is just an HTML page. If there is any changes in the member details then each time web page's source code has to be edited to make any kind of changes in the member details. The normal procedure they are using to update now is if there is any changes in the member's details then the member has to write or mail the concerned person (i.e. the person who is maintaining the web page). Then once in a while these changes will be made. This procedure is taking little time to update the things and the people who are visiting the web site are not getting the correct and updated information as and when it changes.

The other main problem is what the maintenance of the membership database of the society is purely manual. So the society is in need to have the automated the membership database management system. The rule of the society is that the membership database has to be maintained by the secretary of the council of the society. Every year there will be a change in executive council of the society. So what happens is the secretary has to carry the database to his system. So what the society is need is that database system software that is easily portable to all operating system and it should work on all operating system. The software should not be expensive but it should be flexible.

### 3.2 Proposed System

So the society has decided to have the Interactive web pages where in the members can inform the changes to the person who is maintaining the web pages by mailing or by filling up the changes form which will be provided in the web site itself. To maintain the Details of the members the society has decided to have a database, which is most cheap, and it should work on all platforms.

The Proposed system will come over all the disadvantages what the society was facing earlier. The proposed system taking all the considerations and having the discussions with the concerned persons it has been decided to develop the database using C++ so that the same source that is written in C++ can be used on any system. To make the things not to depend on the and functions used are not depending on kind of particular compiler. Only those library functions used which available on all compilers and the remaining codes are written so that it should run on all compilers. C++ has been chosen to develop the database since it is much cheaper and compatible with almost all OS.

Once we have the database, we can connect this database to display all details of the members on the web page. The database has been used so that if any changes are made in the database then automatically that should get updated immediately so that the people who are visiting the society's web site should get the correct and updated information. And one more advantage of this is there is no need to edit the source code of the web pages to make changes of any member; the updation in the database is enough.

### 3.3 Prespective

The database development will reduce the work for the person who is maintaining the web page, because in the earlier system if there was any change in the member's details he was supposed to get in to the source code of the web page get in to that particular line

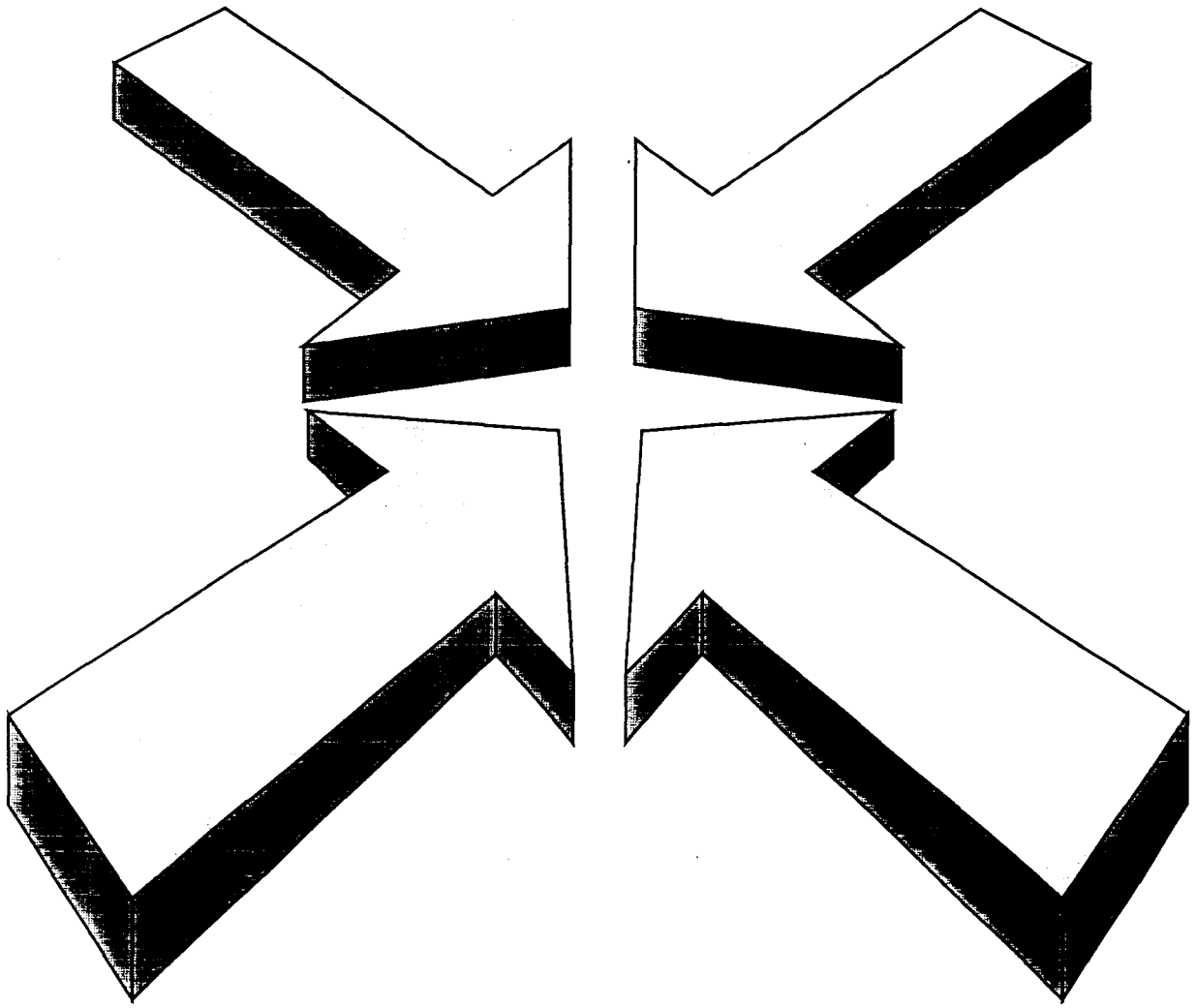
of code where that person's details are there and update the things. Now in the proposed system just a change is to be made in the update option of the database software. The other things on the web page will get updated automatically.

Coming to the Active web page part, earlier the member's use to write or mail the person who use to maintain the web pages regarding the necessary changes to be made and that person was used to change the things when he gets the details. Now this system is also there along with a form to update is provided in the web site itself the member can just fill this form and leave the thing then that will be updated by the person who is maintaining the pages immediately in the database itself. The other option can also be provided in the system so that if fills in the update form it is going to ask for the password of the member and it checks with his database if it is found to be correct then the database itself will get updated directly on the spot by the member himself. The password facility should be provided for this system so that the unauthorized person should not handle the database.

This software is currently used by Astronomical Society of India for its web site and member's database maintenance. The task of developing the Software System was carried out at Raman Research Institute and this involves design and implementation of the whole system.

### **3.4 Objectives**

- This module will be used mainly to maintain the web site of ASI
- To maintain the database of the members of the society
- To decrease the manual labour involved the members database on the web site.
- To provide the Updated and correct information to the people who visit the society's web site.



## **Implementation Procedure**

## 4.0 Implementation Procedure

### 4.1 Activities

This system will perform the following activities

- Store and Updating the Member's Database.
- Maintenance of member's details on the Web page.
- Updation of Member's details on the web.
- Mails and Label generations
- Report generations / Execution of Queries.

### 4.2 Forms

#### 4.2.1 Membership

##### Description

When a member submits his filled in application to the society the entry operator should enter the details that are filled in the computer application in the new membership data entry form of the system. The entered data will be stored in the file called MEMBERDBF.

##### Inputs

- Application Number
- Member Ship Type
- Last Name and First Name
- Residential Address

- Telephone No.
- Date of Birth and Sex
- Office Address
- Telephone No and Fax No.
- Email and Web addresses
- Is he a Employee, Employer
- Additional Informations 1,2 and 3.

**Process**

Depending on the activity to be performed (Add)

- Accept Details
- Validate Entries if required
- Read the date of Birth and Calculate Age
- Update Database

**Outputs**

- Allot a Membership No.
- Messages if there is any blank entries in the data entry sheet.
- Error Messages.

**4.2.2 Update Membership****Description**

When a member submits Update filled in form to the society the entry operator should enter the details that are filled in the computer application in the update membership data entry form of the system. The entered data will be updated in the file called MEMBERDBF.

**Inputs**

- Membership No.
- Member Ship Type
- Last Name and First Name
- Residential Address
- Telephone No.
- Date of Birth and Sex
- Office Address
- Telephone No and Fax No.
- Email and Web addresses
- Is he a Employee, Employer
- Additional Informations 1,2 and 3.

**Process**

Depending on the activity to be performed (Modify / Delete)

- Accept Details
- Validate Entries if required
- Read the date of Birth and Calculate Age
- Update Database

**Outputs**

- Do the activity requested i.e. update
- If the request is to delete the membership details mark delete for the record.
- Messages if there is any blank entries in the data entry sheet.
- Error Messages.



### 4.3 Database

The database maintenance module is developed to maintain the members database. In this the provided options for the user are

- Add a Member
- Delete a Member
- Modify a Member
- Recover a Member
- Query Member
- Compress Database
- Quit

Add a Member module is used to add a new member.

Delete a Member module is used to cancel the membership of a member.

Modify a Member module is used to modify or update the informations of a member.

Recover a Member module is used to recover the deleted membership details of the member. That is if the Membership of a member has been cancelled for some reason and if the Membership has to be recovered later at this point this module can be used.

Query a Member is to put some queries on the Membership database and to get some important reports and queries. This is used to get different types of reports and Labels.

Compress Database is the module used to update the database. That is when Delete a Member module is used the member record will be marked for deletion it is not exactly deleted from the database. When Compress database option is used the record will be

permanently removed from the membership database file. Later this record is not recoverable.

#### 4.4 Reports

The Database Management of ASI is provided with reports like

**Membership Type Report:** This report is used to get the reports on different types of memberships what the ASI has. That is like the number student members along with the details of these members etc.

**Membership Renew Report:** This report is used to get all the members list who have renewed their memberships. This is helpful in reminding the members who have not renewed their memberships.

#### 4.5 Queries

The system is provided with the option of querying the members database. The query may be on single member or group of members. The query may be upon the area of interest of the member or about his membership details.

#### 4.6 Mails and Labels

The system is provided with mailing and labeling option. If the members have to be informed about some meeting or any other information the ready letters are their for these mails the addresses can be pasted using the labels option which will generate labels for the desired members. This option will reduce the work of writing addresses of each member of informing.

#### 4.7 Security

The system is provided with the username and the passwords so as to prevent the unauthorized persons to use this software. Whenever the system is started the user has to give his user name and password so as to secure the members data.



# Testing Procedure

## 5. Testing Procedure

The main objectives of the system are

- Store and Updating the Member's Database.
- Maintenance of member's details on the Web page.
- Updation of Member's details on the web.
- Mails and Label generations
- Report generations / Execution of Queries.

The tests have been made on each form for its correctness of accepting the data and storing the data into the respective tables in the desired form of data type. The main objective and the concentration of the testing was on the whether the system works on all the operating systems or not and the same set of code works on all the compilers or not. These test were done on operating system like DOS, WINDOWS, digital UNIX, Sun Solaris and RED HAT LINUX the same set of programs were tested on compilers like Turbo C++, Borland C++, and the compilers of Sun Solaris, digital and LINUX. These algorithm were tested with the test data first and then these were tested with the last years data and have been compared with the results the of the last years data. The test were made for all types constraints. The tests were done in presence of the user so that he can get some familiarity with the system that is going to be introduced for the later years. During the testing each objective of the system has been tested and found to be working correct. The reports produced by the system has been compared with the last years reports and these were found to be correct.



## Conclusions

## 6.0 Conclusions

This package is user friendly system, which can be utilized with the basic knowledge of the Data Entry functions. The package has been developed as extremely interactive in order to avoid confusion and also to encourage correct and accurate processing of data.

The following factors, which are most important for the success of a project, have been taken care of:

- ◆ Fully Menu driven
- ◆ User Specific Menus
- ◆ Uniform and User Friendly Screens
- ◆ Entry time data validation
- ◆ User Confirmation after data entry before update
- ◆ Reports available in different modes
- ◆ Queries of all possible types.
- ◆ Automated procedures.

**Operating Environment:** C++, HTML, CGI and Sun Solaris Operating System and Netscape Navigator.

**Future enhancements:** Addition of any new modules like downloading the applications from the ASI's Home page and applications can be collected either on the web or through posts can also be implemented for new memberships.

### Assumptions and Dependencies

- The Operator himself crosschecks the Data entry done by the entry operator.
- The data provided by the member while submitting his application is true.



## Appendix

## 7.0 Appendix

### 7.1 System Specification

#### Development Environment

Hardware: Sun UltraSparc Enterprise-4000 (10 cpu m/c) / 2000 MB RAM /  
20 GB Hard Disk / Clock 250 MHZ / MFLOPS 1000

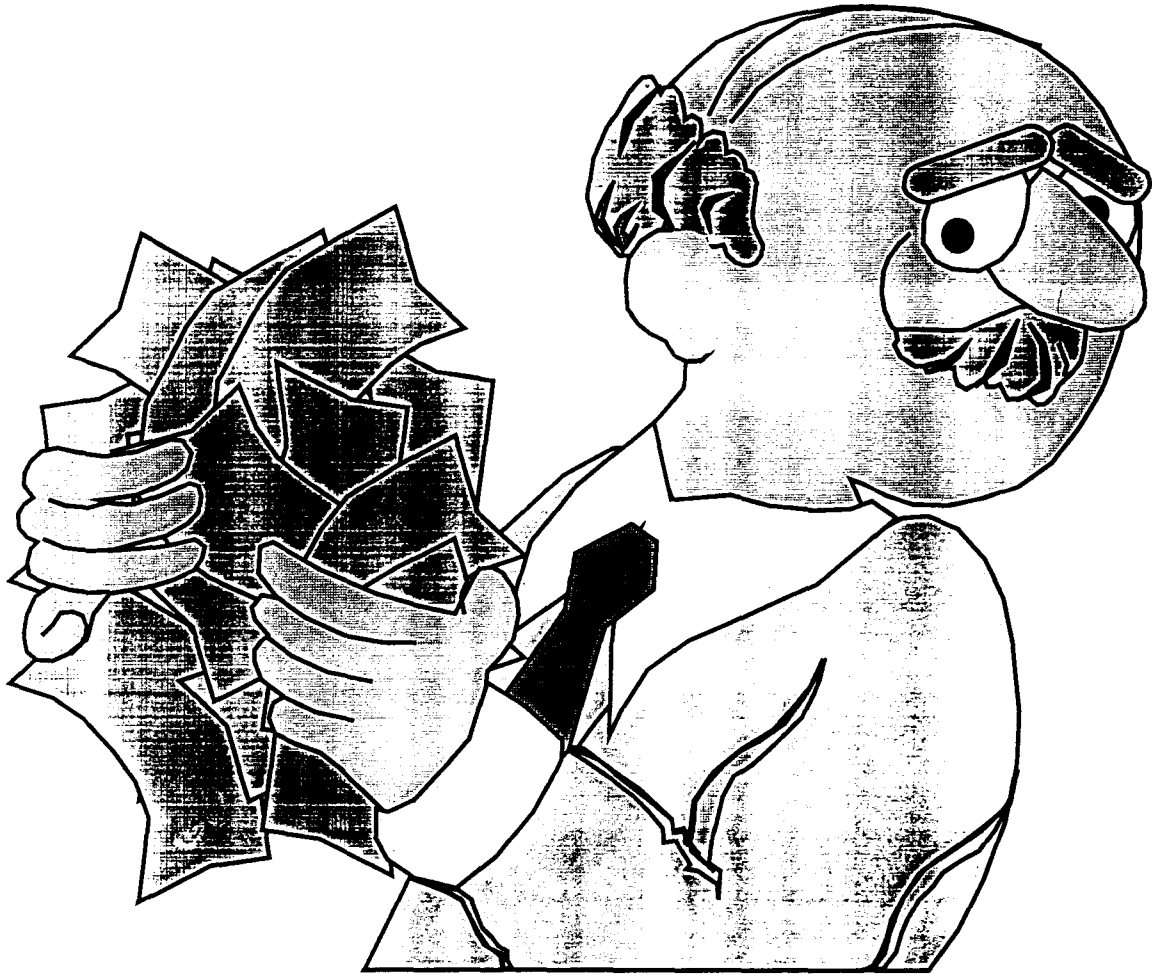
Software: Solaris 2.6, Netscape Communicator, C++

#### Operating Environment specification:

Hardware: 486 Machine /16 MB RAM / 500 MB Hard disk

Software: Windows 95 Operating System with Internet explorer / Netscape communicator  
or Any OS with Internet Access





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