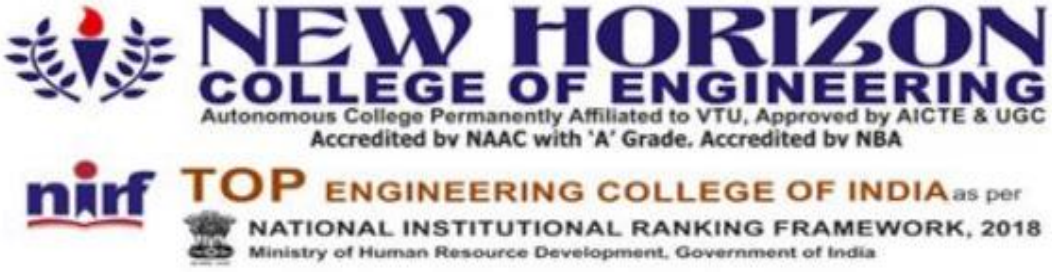


DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

E-Access

A MINI PROJECT REPORT

Submitted by

P.LAKSHMI SUMANA

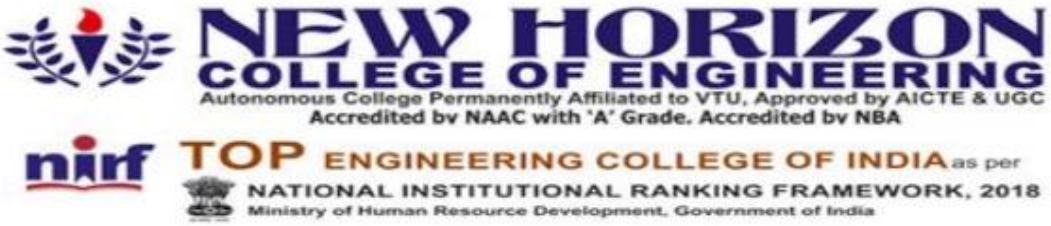
USN: 1NH18CS132

In partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate

This is to certify that the mini project work titled

LIBRARY INFORMATION TECHNOLOGY

Submitted in partial fulfilment of the degree of Bachelor of Engineering

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DURING

EVEN SEMESTER 2019-2020

COURSE CODE: 19CSE39

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E-ACCESS

ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	M S Pramod, N Nataraja, Smitha Srinivas Naik, Manoj S Pramod, M Pruthvini, Rakshitha Raghavendra. "Design of an IP Based Communication Terminal to Provide High Fidelity Voice and Data Communication", 2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), 2019 Publication	2%
2	Kishori Sharan. "Beginning Java 9 Fundamentals", Springer Science and Business Media LLC, 2017 Publication	2%
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4	Vaskaran Sarcar. "Interactive Object-Oriented Programming in Java", Springer Science and Business Media LLC, 2020 Publication	1%
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ABSTRACT

The main aim of this project is to provide a simple messenger like platform using GUI. We will use a simple programming language like Java and develop the modules in this project. Java contains certain swings which contain some methods that would be easier to design a project with ease of code. GUI is a user interface that allows us to interact with devices through graphical icons and visual indicators such as secondary notations, instead of text based user interface or text navigation. The actions in a Graphical User Interface are usually performed by direct manipulation of the graphical elements. GUIs are used in many mobile devices like MP3 players, portable players, gaming devices, phones and small household, office or industrial controls. It is not applied to lower-display resolution of interfaces like video games not including flat screens, like volumetric displays because it is restricted to two-dimensional display screen to describe generic information, in the tradition of the computer science research at the Xerox Palo Alto Research Center. By the 1980s, mobile phones and game systems are also employed application specific touch screen GUIs. New automobiles use GUIs in multimedia centers, or navigation multimedia center combinations.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

I have great pleasure in expressing gratitude to **Dr.Mohan Manghnani**, Chairman of New Horizon Educational Institutions for providing necessary infrastructure and creating good environment

I take this opportunity to express my profound gratitude to **Dr.Manjunatha,** Principal NHCE, for his constant support and encouragement.

I am grateful to **Dr.Prashanth C.S.R**, Dean Academics, for his unfailing encouragement and suggestions, given to me in the course of my project work.

I would also like to thank Dr**. B. Rajalakshmi**, Professor and Head, Department of Computer Science and Engineering, for her constant support.

I express my gratitude to **Ms.Heyshanthini,** assistant professor, my project guide, for constantly monitoring the development of the project and setting up precise deadlines. Her valuable suggestions were the motivating factors in completing the work.

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INTRODUCTION

1.1 PROBLEM DEFINITION

The main aim of this project is to provide a simple messenger like platform using GUI. We will use a simple programming language like Java and develop the modules in this project. Java contains certain swings which contain some methods that would be easier to design a project with ease of code. GUI is a user interface that allows us to interact with devices through graphical icons and visual indicators such as secondary notations, instead of text based user interface or text navigation. The actions in a Graphical User Interface are usually performed by direct manipulation of the graphical elements. GUIs are used in many mobile devices like MP3 players, portable players, gaming devices, phones and small household, office or industrial controls. It is not applied to lower-display resolution of interfaces like video games not including flat screens, like volumetric displays because it is restricted to two-dimensional display screen to describe generic information, in the tradition of the computer science research at the Xerox Palo Alto Research Center. By the 1980s, mobile phones and game systems are also employed application specific touch screen GUIs. New automobiles use GUIs in multimedia centers, or navigation multimedia center combinations.

1.2 OBJECTIVES

The objective of this project is to implement a simple messenger like platform with the help of GUI based code. By submitting the inputs like username and password clients will be logged into their respective accounts. If a client does not have an account they can register by submitting few basic details. After logging a list of their friends present in the account are displayed. Each users account is separated, and by clicking on the account a chat details or login details will be displayed. Here a person will be able to see their login details and texts. New members can also be added to the list by registering their respective accounts.

1.3 METHODOLOGY

In this project, Object Oriented Concepts of java plays a major role in e-access.

In the methodology of the code we can divide the whole program into four modules.

1. Login page

2. Signup

3. Second Frame

4. Login details

1. Login page: In this module we take the inputs from the user which is the username and passwords as Labels and providing their respective text fields. It also contains Reset and submits buttons. When we click on submit a new window opens where all the list of friends are displayed.

2. Create new account: If the user wishes to create a new contact we can click on signup button. After clicking it displays a form where all the details of the user are to be entered as input. And that new contact will be added to the contacts list.

3. Sign in: After entering the username and password when we click on login a new frame opens up which contains the list of contacts a user have.

4. Login details: When multiple contacts are added then the details of each contact like last seen, first message, last message, contact name and password

1.4 EXPECTED OUTCOMES

- By submitting the inputs like username and password he/she gets logged into their respective account.
- After logging in, the list of friends present in the account will be displayed. Everyone's account is separate and by clicking on the account a chat history will be displayed.
- Here a person is able to communicate through messages.
- New members can also be added to the list by creating/ by adding their respective accounts.

1.5 HARDWARE REQUIREMENTS

- Processor : any processor
- RAM : 256MB or more
- Output device : any screen

1.6 SOFTWARE REQUIREMENTS

- Operating system : Windows, MAC or Linux
- Programming language : java
- User interface : HTML, APPLET

CHAPTER 2

OBJECT ORIENTED CONCEPTS

Java is an object-oriented program, platform independent, multi-purpose programming language which is produced by Sun Micro system which is currently the subsidiary of Oracle. Java is a high-level programming language which is portable and platform independent. Java is fast, secure and reliable. It was first released in the year 1995; it was developed to be a machine independent web technology. It was developed based on C and C++ language syntax to make it easy and simple for programmers. Since then, Java has earned a prominent place in the world of computer programming.

FEATURES OF JAVA / CHARACTERISTICS OF JAVA / BUZZWORDS OF JAVA ARE:

- Simple
- Secure
- High performance
- Object oriented
- Distributed
- Complied and Interpreted
- Portable
- Dynamic
- Architecture neutral
- Robust
- Multithread

SIMPLE

Java was designed to make easy for professional programmers to learn quickly and use effectively. It is simple and easy to learn for the programmer who already know the basic concepts of C / C++ language because It was developed from C / C ++ Language syntax.

SECURE

Java is confined solely to the Java execution environment- JVM (JAVA VIRTUAL MACHINE). When a web browser of java compatible is used, downloading can be done safely and easily without any concern or fear of viral infections.

HIGH PERFORMANCE

Performance of the Java is high because of usage of the byte code. Byte code is the instruction set designed for the efficient execution. Byte code simply interprets the code into native machine code thus it enables us to execute in any operating system. Java is faster when compared with other traditional interpreted programming language.

OBJECT ORIENTED

Java is an object-oriented language. All the program code and data reside within the objects and classes. The object model in Java is simple, easy to extend, easy to maintain and it is also reusability. Java comes with an extensive group of classes that are organized in packages which may be used in programs through inheritance.

DISTRIBUTED

Java is intended to develop a distributed environment. Java is used for creating applications on network. It permits programmers in multiple remote locations to collaborate and work together on a single project.

COMPILED AND INTERPRETED

Computer language is either compiled or interpreted. But Java combines both compiled and interpreted and makes it into two stage system.

- **COMPILED:** Java enables the creation of a cross platform programs by compiling it into an intermediate representation which is called Java Bytecode.
- **INTERPRETED:** After compiled, Byte code is interpreted which generates machine code that can be directly executed by the machine which provides a Java Virtual Machine.

PORTABLE

It helps in generating Portable executable code by providing a way to download programs dynamically to all various kinds of platforms connected to the internet.

DYNAMIC

Java can link in new methods and strategies, new class libraries and objects. It can also link native methods (the function which is written in different programming language such as C and C++). It additionally has a compilation and automatic memory management.

ARCHITECTURE NEUTRAL

Java language and Java Virtual Machine (JVM) helped in achieving the goal i.e, "WRITE ONCE; RUN ANYWHERE, ANY TIME, FOREVER". change in operating systems or update in operating systems, processor and system resources will not force any changes in Java programs.

ROBUST

It provides strong memory management, avoids security issues, automatic garbage-collection and additionally exception handling. It also provides several options that build the program execute reliably in numerous types of environment. Java is strictly typed language/ written Language which checks the code both at compile time and runtime.

MULTITHREADED

It helps in parallel execution i.e., several tasks performing at once. Multithreaded programs handle multiple tasks at the same time that helps in creating interactive, networked programs. Java run time systems support the synchronization of multi process which is used to construct smoothly interactive systems.

JAVA ENVIRONMENT

The programming Java environment consists of three components mainly:

- Java Development Kit (JDK)
- Java Runtime Environment (JRE)
- Java Virtual Machine (JVM)

These three components / elements are platform dependent because the configuration of each Operating System is totally different from one another. Whereas, Java is platform independent.

1) JAVA DEVELOPMENT KIT (JDK)

JDK is the environment for software development which is used to develop Java applications and applets.

SEVEN MAIN TOOLS IN JDK ARE: -

- The Java compiler - javac
- The Java interpreter - Java
- Generates documentation in HTML - javadoc
- The Java interpreter to execute Java applets - appletviewer
- The java debugger to sort out bugs and fix bugs in Java program - jdb
- The Java disassemble to displays the accessible functions, information and data - javap
- To Create interface between Java and C routines – javah

2) JAVA RUNTIME ENVIRONMENT (JRE)

JRE provides minimum needs (requirements) for executing a Java application. It includes the Java Virtual Machine (JVM), core classes and supporting files.

3) JAVA VIRTUAL MACHINE (JVM)

JVM is an abstract machine. It is additionally called as Virtual Machine because it doesn't exit physically. It can run other programs which are written in other languages and compiled to Java bytecode. It can also provide a run-time environment in which Java bytecode can be executed.

The three notions of JVM are:

- **SPECIFICATION** The operating of Java Virtual Machine (JVM) is fixed whereas the implementation provided was independent to pick out the algorithm. Implementation of JVM was provided by Oracle and other companies.
- **IMPLEMENTATION:** It is a computer program which meets the requirements of the Java Virtual Machine's specification. Its implementation is additionally known as Java Runtime Environment (JRE).
- **RUNTIME INSTANCE:** An instance of JVM is formed when the programmer writes Java command on the command prompt to run the Java class

JVM performs few main tasks such as loads the code, verifies/checks the code and eventually executes the code.

- The main method which is present in Java code was called by JVM.
- JVM is also known as Runtime Interpreter
- JVM widely helps in the abstraction of the inner implementation for the programmers who utilities the libraries to develop their programs from JDK.

2.1 CLASS

- class is like a blueprint or a template for creating objects in java. It defines the state or behavior of the object created. class can have any number of variables, and methods of various types to access to different values.,
- Each class has a constructor, it can be of type default or parameterized. These constructors are used to initialize objects, with default values. class can also inherit characteristics from other class.
- While defining a class, we can declare its exact form and nature, by specifies the data that it contains and the code which operates on the data.
- The class is declared by use of the class keyword. The general form of a class definition is as follows:

```
Class className {
type instance-variable 1;
type instance-variable 2;
//…
type instance-variable N;
type method name 1(parameter-list) {
//body of method
}
type method name 2(parameter-list) {
//body of method
}
type method name 3(parameter-list) {
//body of method
}
}
```

- A class declaration can include these in order:

Access Modifier -> Class name -> Superclass -> Interface -> Body

There are various types of classes such as:

- Nested class
- Anonymous class
- Lambda expressions

Syntax:

class ClassName

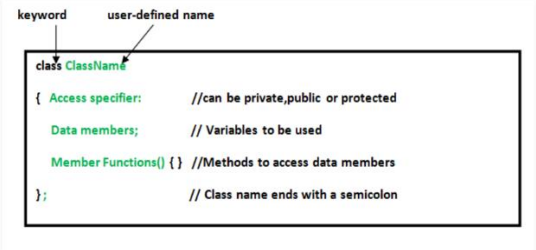

Fig 2.1 (a)

- The data,or variables,defined wothin a class are called instance variables.The code contained within methods.Collectively the methods and variableddefined within a class are called members of the class. In most classes,the instance variables are acted upon and accessed by the methods defined for that class.thus the methods determine how a class data can be used.
- Putting the number elements and methods into together in the definition of a class is called encapsulation.

2.2 OBJECT

- The object is a self-contained entity that has a state, behavior and identity.
- Examples: A dog has different states colors, names, breeds as well as behaviors.
- Object allocates memory for the template class. It defines the behavior of the class. It is a specimen or instance, of class used to invoke or execute any of the methods or features of the class for which object is created.
- An object contains physical as well as logical entity whereas a class does not. Memory or storage allocation takes place for a class when object is created. The methods and the variables of a class are accessed using objects.
- Objects of a class has a two steps process:

- The First, must be declare a variable of the class types
- Second. must acquire an actual, physical copy of the object and assign it to the variable, using the new operator.

Syntax:

Classname objectname;

Classname reference_variable=new Classname();

2.2.1 Method Overriding

- It is a method in a subclass has the same name and type signature as a method in its superclass then the method in the subclass is said to be override method in the superclass.
- Method overriding occurs when the names and also the type signatures of the two methods which are identical. Then the two methods are simply overloaded.
- So, to access the super class version of an overridden method can be called using Super.

2.2.2 Declaring Objects

- When a class is created, we are creating a new data types.
- This type is also used to declare objects of that type.
- However, obtaining the objects of a class is a two-step process,
- In First case, we must declare a variable of the class type. This variable does not define any object. Instead of it is simply a variable that can refer to an object.
- In Second case, we must acquire an actual, physical copy of the object and assign it to that variable by using the new operator.
- The new operator is dynamically allocates memory for an object and returns a to it.

2.2.3 CONSTRUCTOR:

- Constructor in java is a specified type of method which is used to initialize the object. The java constructor is invoked at the time of object creation. So, automatic initialization is performed through the use of a constructor.
- It constructs the value i.e provides data for the thing that's why it is referred to as Constructor
- There are two rules defined to the constructor:
  - Constructor name must be same as its class name
  - Constructor must have no explicit return type
- There are two types of Constructors:
  - Default constructor (no-arg constructor)
  - Parameterized constructor: It accepts a certain parameter which is called Parameterized constructor.
  - Garbage Collection: It occurs only sporadically during the execution of programs. The objects are dynamically allocated by using the new operator, how such objects are destroyed and their memory released for later reallocation.

2.3 INHERITANCE

Inheritance is an oops concept in java that permits us to define a category from an existing class. The keyword 'extends' is employed for inheritance.

• Superclass: The parent/base class from which attributes, methods are inherited.

• Subclass: The child/derived class which inherits attributes, methods.

1. SINGLE INHERITANCE

Single inheritance is when a category inherits properties from one class only. All the attributes except private members are inherited or extended by child class from parent class.

```
class A
{
}
```

```
class B extends A
{
}
```

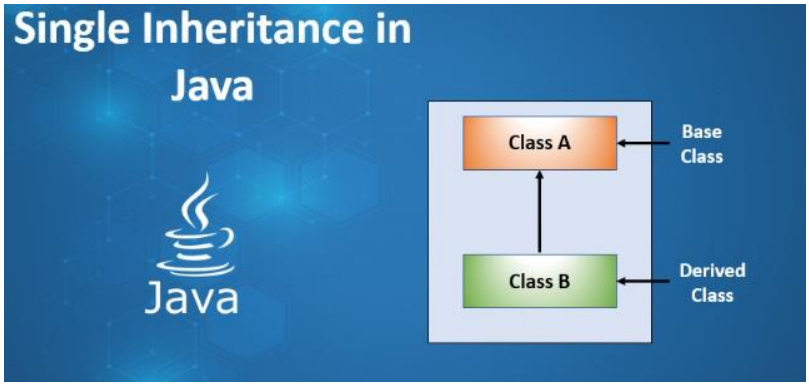

Fig 2.3 (a)

2. MULTILEVEL INHERITANCE

Multilevel inheritance is when a category inherits properties from derived class. This derived class becomes the parent for the new child class. It allows accessing of grandparent class attributes by the kid class also.

```
class A
{
}
class B extends A
{
}
class C extends B
{
}
```

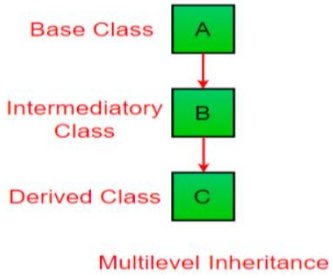

Fig 2.3 (b)

3. HIERARCHICAL INHERITANCE

Hierarchical inheritance is when a category is inherited two or more classes. during this sort of inheritance all of the super class's sub classes inherit same attributes of the parent class.

```
class A
{
}
class B extends A
{
}
class C extends A
{
}
```

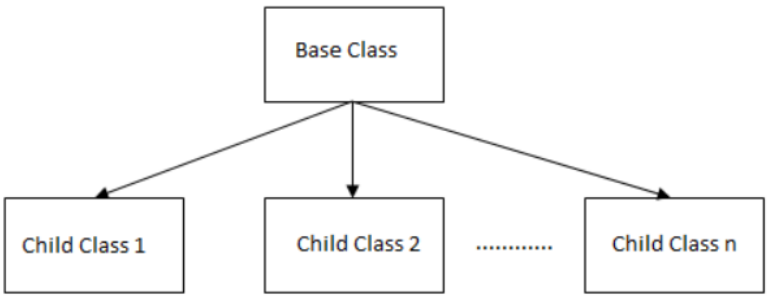

Fig 2.3 (c)

2.4 POLYMORPHISM

Polymorphism may be a vital concept in object-oriented programming. It means an equivalent object, method or operator acts differently in several cases.

Types of polymorphism are:

- Run-time polymorphism
- Compile-time polymorphism

Run-time polymorphism is completed using method overriding.

Method Overriding: It means different methods have same syntax and return type.

```
class A{ }

class B extends A{

public void display(){

System.out.println(“Method1”);

}}

class C extends A{

public void display(){

System.out.println(“Method2”);

}}
```

Compile-time polymorphism is completed through method overloading and operator overloading.

Method Overloading: It means different methods with same name differ in number, type or sequence of arguments passed in them.

```
class A{

public void display(int a){

System.out.println(a);

}}

class B{

public void display(String s){

System.out.println(s);

}}
```

```
class C{

public void display(int x, int y){

System.out.println(x+" "+y);

}}
```

Operator overloading: '+' operator is employed for concatenation also as addition operator.

```
System.out.println(m+"ways");

System.out.println(a+b);
```

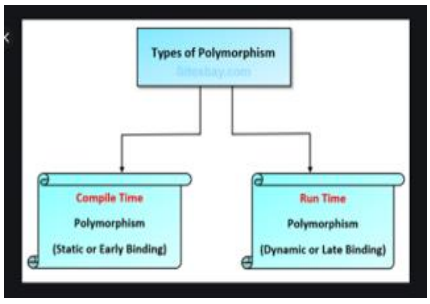

Fig 2.4 (a)

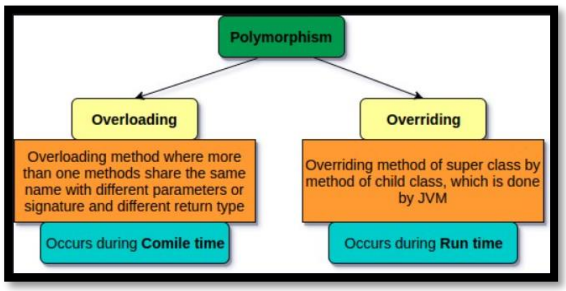

Fig 2.4 (b)

2.5 ABSTRACT CLASS

An abstract class may be a template definition of methods and variables of a category which may be a category of objects that contains one or more abstracted methods. Abstract classes are utilized in all OOP languages. Objects or classes maybe abstracted, which suggests that they're summarized into characteristics that are relevant to the present program's operation.

Individual instances that are resulting from classes are objects. Declaring a category as abstract means it cannot be directly instantiated, which suggests that an object cannot be created from it. That protects the code from getting used incorrectly. Abstract classes which subclasses are to be further define as attributes are necessary for individual. Abstract classes similar with main classes, which are the default type. A

concrete class has no abstracted methods and should be instantiated and utilized in code.

Syntax:

Class abstract classname {…}

Points to Remember:

• An abstract class should be announced with an abstract keyword.

• It have only abstract methods and also non-abstract methods.

• It can't be instantiated.

• It can have constructors as well as static methods also.

• It can have final methods which may force the subclass to not change the body of the tactic.

2.6 MULTITHREADING

Multithreading in java could also be a process of executing multiple threads. A thread may be a lightweight sub-process which is that the smallest unit of processing. Multiprocessing as well as multithreading, both are used to perform multitasking. However, we use multithreading than multitasking than multiprocessing because threads use a shared memory. They won't allocate separate memory spaces to saves memory, and switching between the threads which takes less time to process. Java Multithreading is typically utilized in games, animation, etc.

Multitasking could also be a process of executing multiple tasks simultaneously. We use Multitasking to utilize the CPU. Multitasking is often achieved in two ways:

Process-based Multitasking (Multiprocessing)

Thread-based Multitasking (Multithreading)

1) Process-based Multitasking (Multiprocessing)

• Each process has an address in memory. Process based multitasking allocates a separate memory areas.

• A process is heavyweight.

• Cost of communication between the tactics is high.

• Switching from one process to a different requires a while for saving and loading register, memory maps, updating lists, etc.

2) Thread-based Multitasking (Multithreading)

• Threads share an equivalent address space.

• A thread is lightweight.

• Cost of communication between the thread Is slow

2.7 I/O FUNCTIONS IN JAVA

I/O functions in java are wont to process the input and provide output. It uses concept of Streams to operations fast. We will also perform file handling in java using these streams.

• System. Out

• System.in

• System. Err

• Output Stream

• Input Stream

Example:

```
Scanner s=new Scanner(System.in);

System.out.println(“Hello”);

System.err(0);
```

Fig 2.7

2.8 PACKAGES IN JAVA

Packages in java are to encapsulate a gaggle of class's sub-packages and interfaces. It prevents naming conflicts and also provides controlled access and is referred to as data encapsulation**.**

- Packages are containers for classes that are used the category name.
- Through the utilization of the interface keyword; Java allows to completely abstract the interface from its implementation.
- By using interface, we will specify the set of methods which will be implemented by one or more class.
- In interface itself, doesn't actually define any implementation.
- A class can implement quite one interface.,
- Java provides a partitioning the category name space into more manageable chunks. This mechanism is named a package.
- In package are both a naming and a visibility control mechanism.
- It is feasible to define classes inside a package that aren't accessible by code outside those packages.

2.8.1 Defining Package

- To create a package simply include a package command is that the first statement during a Java source file.
- Any classes declared within that file is belong to the required package.
- Package statement defines name space during which classes are stored.

• If we skip the package statement the category names are put into the default package, which has no name.

• The general sort of the package statement is as follows package pkg;

• During this pkg is that the name of the package.

• For instance we will consider the subsequent statement creates a package called My Package.

2.9 Exception handling

- It allows us to handle the runtime errors caused by exceptions.
- An exception is a not normal, It occurs during the execution of a program like compile time that includes the flow of instructions.
- Languages that do not support exception handling, errors must be checked and handled manually—typically through the use of error codes [system generated error codes from 0 to 499].
- This approach is as cumbersome as it is troublesome.
- Java's exception handling avoids these problems and, brings semantic error management into the object- oriented world. All exception handling types are subclasses of the built-in class which is called Throw able.

2.9.1 Exception Types:

- Throw able is at the highest of the exception class hierarchy.
- In the below Throw able they are two subclasses which takes partition exceptions into two different branches.
- One branch is headed by Exception.
- This class is employed for exceptional conditions that user programs should catch.
- This is also the category that you simply will subclass to make your own custom exception types.
- There is a crucial subclass of Exception, called Runtime Exception. Exceptions of this sort are automatically defined for the programs that you simply write and include things like division by zero and invalid array indexing.
- The other branch is topped by Error.

- These are not expected to be caught under normal circumstances by your program, are typically created in response to catastrophic failures that cannot usually be handled by your program.
- Exceptions of type Error are employed by the Java run-time system to point errors having to try to with the run-time environment, itself.
- Stack overflow is an example of such a mistake.

2.9.2 Exception-Handling in Java five keywords

I. try

Program statements that you simply want to watch for exceptions are contained within a try block.

If an exception occurs within the try block, it is thrown.[an object representing that exception is created and thrown in the method that caused it]

II. catch

The code which going to can catch this exception (using catch) and handle it in some rational manner.

It generated exceptions which are automatically thrown by the Java run-time application.

III. throw

For manually throw an exception, we use the keyword called as throw.

IV. throws

Any exception that's thrown out of a way must be specified intrinsically by a throws clause.

V. finally

Any code that absolutely must be executed after a try block completes, is put during a finally block.

CHAPTER 3

ALGORITHM

Algorithm is a procedure which describes step by step to solve the problem or to reach the programming goal in understandable way and intelligible approach. Algorithm includes a begin(start), a middle and last step as finish (end). In fact, programmers have the tendency to label the first step as start and last step as end. Pseudo code is a semi - programming language which is used to describe the steps in associative algorithmic program.

Step 1: start

Step 2: insert the header files which are required for the project.

Step 3: declare all the variables which are required for the project.

Step 4: create the methods and functions to perform required specifications.

Step 5: to develop the program more effectively as well as efficiently, oops concepts such as class, array objects, inheritance and exceptional handling was implemented.

Step 6: Initially, it displays create account.

Step 7: later client have to login through his user name and password.

Step 8: if the client does not have an account then he can create one using the option register. Client has to enter the following details to create his account.

1. User name
2. password
3. mail id
4. date of birth
5. gender
6. face book id
7. age

After entering all the details it prints “SUCCESSFULLY REGISTERED".

Step 9: later the client can see his/her login details by selecting the login details option.

After choosing the option the following details will be displayed

1. User name

2. Password

3. Last seen

4. First message

5. Last message

Step 10: the client can go back to login page by choosing the option back to login page.

Step 11: End

CHAPTER 4

IMPLEMENTATION

4.1 IMPLEMENTATION OF CONSTRUCTOR

Step 1: create a constructor whose name must be same as its class name. In this project, "SUMANA" is the class name as well as constructor name.

Step 2: constructor can be default constructor or parameterized construction. This project deals with the default constructor in which there is no argument passed.

Step 3: the values for the variables are initialized inside the constructor. String variables are initialized to null and integer variables are initialized to zero.

4.2 IMPLEMENTATION OF INHERITANCE

Step 1: create a super class (parent class) which contains features and variables

Step 2: in this project, features of super class contains the methods to perform bank operations such as login, register, login details.

Step 3: create the sub class (child class) which inherits the features of super class (parent class). "Extends" is the keyword to inherit the features of super class.

Step 4: in the sub class, create an object by using the "new" operator which allocates the memory for the objects and then initialize using constructor and access the member variables.

4.3 IMPLEMENTATION OF EXCEPTION HANDLING

Step 1: in Java try, catch, throw throws and finally are the five keywords for exception handling. In this project try and catch are the two keywords implemented for the exception handling.

Step 2: code is enclosed within the try block. Try block is followed by the catch clauses which specifies the exception type catch.

Step 3: once the exception occurs in try block, then the cursor comes out of the try block and executes the catch statement.

Step 4: after the execution of catch statement, the program control continues with the next line in the program.

4.4 IMPLEMENTATION OF THE ARRAY OF OBJECTS

Step 1: an array of objects created using 'object'class.

Step 2: the array element stores the location of the reference variables of objects.

Step 3: the following statement is used to create an array of objects: Class_name objarr[ ];

Step 4: declare and instantiate the array of object : class_name objarr[ ] = new class_name[array_length];

CHAPTER 5

RESULTS

Fig 5.1

Initially when the client has to login

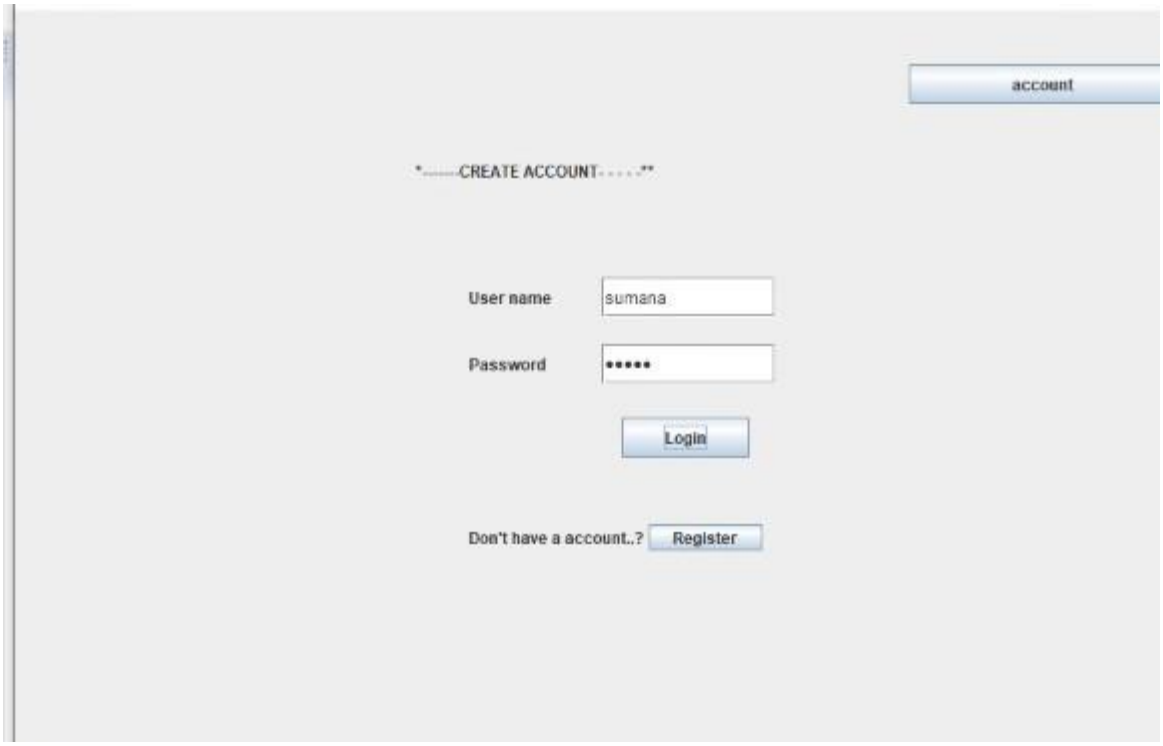

Fig 5.2

After login it shows successfully logined

Fig 5.3

When customer does not have a account he can register

Fig 5.4

When a customer registers then it shows successfully registered

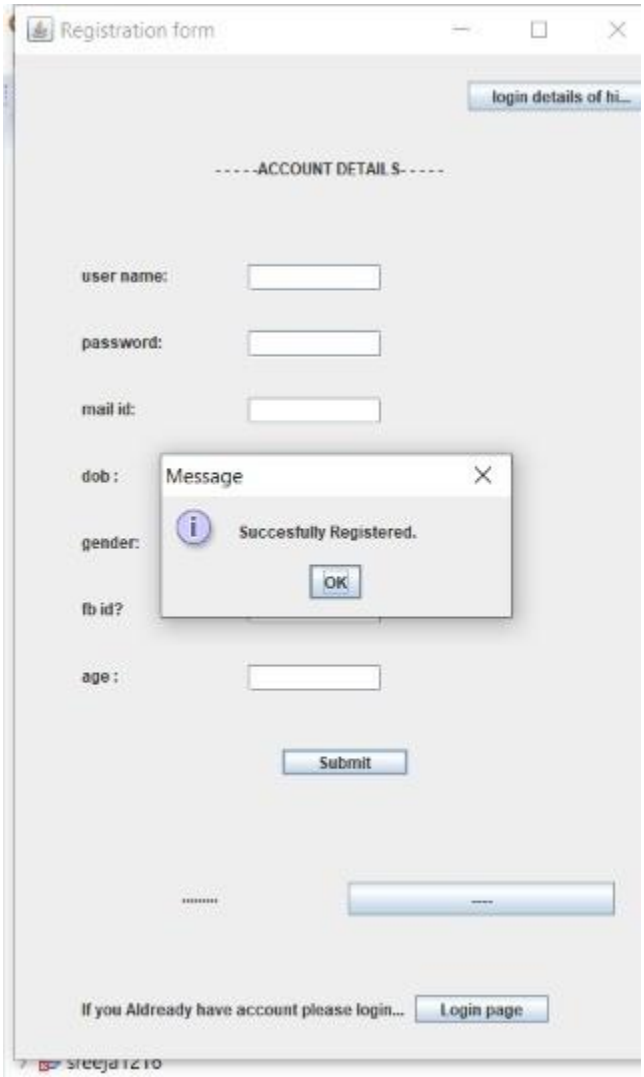

Fig 5.5

When a client wants to see the login history

CHAPTER 6

CONCLUSION

This project mainly deals with the e-access which is implemented by the object-oriented concepts in Java. It has its own merits and demerits. The main advantage of implementing the e-access is to reach the clients (customer) satisfaction. Customers do not have to go places to meet their friends in order talk to them. They can access their account at any time, any place, anywhere.

Chapter 7

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