

MCS-024 → ~~Dec-2021~~ June-2022 →

- Q1. what is an abstract class? How is it used to implement Polymorphism in Java?  
Give suitable example in support of your answer.

A: what is abstract :- A class which contains the abstract keyword in its declaration is called abstract class.

- It may or may not contain abstract methods.
- It can have abstract and non-abstract methods.

\* Implementation of Polymorphism,

- Abstract classes provide runtime Polymorphism.

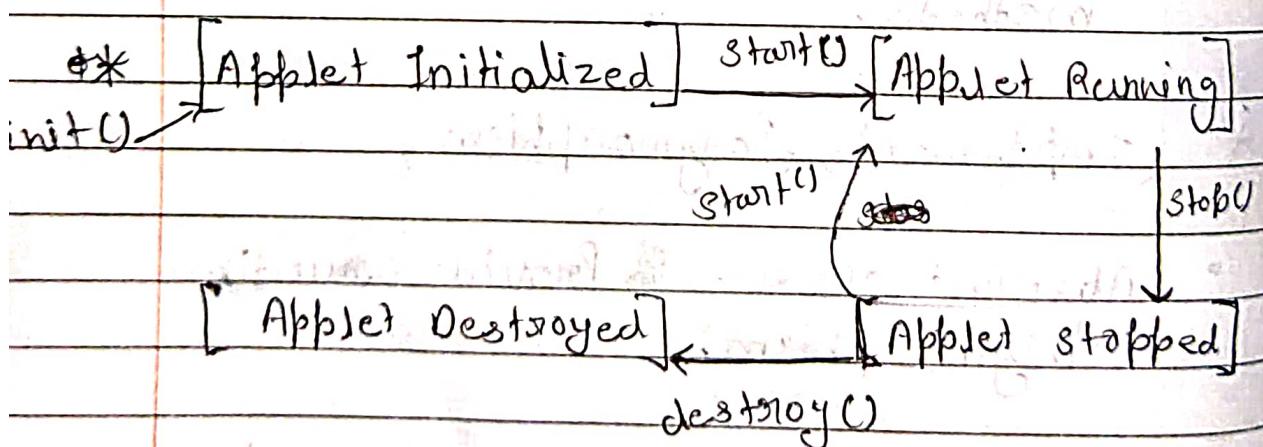
- Abstract classes are useful when used in a combination with array or Java collections classes such as ArrayList or Map.

B easy code:

Q2. What is an applet? Why is main() not included in ~~an~~ writing a Java applet program?

Ans. An applet is a Java program that runs in a web browser.

- An applet is a Java class that extends the `java.applet.Applet` class.
- No main() method.
- ~~Applets are designed to be embedded~~
- JVM is required to view an applet.
- Applet have strict security rules that are enforced by the web browser.



Q3. Explain the process of inter thread communication in Java, with the help of a suitable example.

Q5. Inter-thread :- Inter-thread communication is a mechanism in which a thread releases the lock and enters into Paused state and another thread acquires the lock and continue to execute.

- They are three methods
  - wait()
  - notify()
  - notifyAll()

Ex:- class item {
 int i;
 boolean produced = false;
 public void synchronized produce(int x)
 { if(produced)

{ produced = true;
 i = x;
 notify();
 }
 catch (Exception e)
 { }

else
 i = x;
 produced = true;
 notify();
 }
}

class item {
 int i;
 boolean produced = false;
 public void consume()
 { }

```
if (lProduced)
{ try {wait();}
```

```
catch (e) {}
```

```
}
```

```
lProduced = false;
```

```
notify();
```

```
}
```

```
}
```

Q4. Differentiate between throw with throws statement. Give example code for each.

A.

throw

throws

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• throw keyword is used to throw an exception object explicitly.</li><li>• throw keyword always present inside method body.</li><li>• we can throw only one exception at a time.</li><li>• Throw is followed by an instance.</li></ul> | <ul style="list-style-type: none"><li>• throws keyword is used to declare an exception as well as bypass the caller.</li><li>• throws keyword always use with method signature.</li><li>• we can handle multiple exceptions using throws keyword.</li><li>• throws is followed by class.</li></ul> |
|--|--|

Q5. What is classpath? Explain the utility of classpath, with the help of a suitable example.

- A). Classpath is also an environment variable.
- It is used by Application classLoader to locate the class file.
- You are required to include all the directories which contain class and JAR file.
- Classpath describes a location where all required files are available which is used in our application.
- Java Compiler and JVM will use classpath to locate required files.
- If we do not set classpath then Java compiler will not able to find required files hence you will get errors.

Q6. Compare Private and Protected access specifiers. Give suitable example for each.

Q7.

ProtectedPrivate

- The keyword used is 'protected'.
- Protected can be used within the same class.
- Protected can be used in the same Package Subclass.
- Protected can be used in different Package Subclass.
- Protected cannot be used in different Package non-subclass.
- The keyword used is 'private'.
- Private can be used within the same class.
- Private can not be used in the same Package Subclass.
- Private can not be used in different Package non-subclass.

Q7. Differentiate between Method - overloading and Method - overriding, with the help of a suitable example.

Qn.

Method overloading

- It is performed with multiple methods in the same class.

- Parameters must be different in case of overloading.

- is an example of compile-time Polymorphism.

- Return type can be different but you must change the parameters as well.

- Static methods can be overloaded.

Method overriding

- It involves multiple classes.

- Parameters must be same in case of overriding.

- It is an example of runtime Polymorphism.

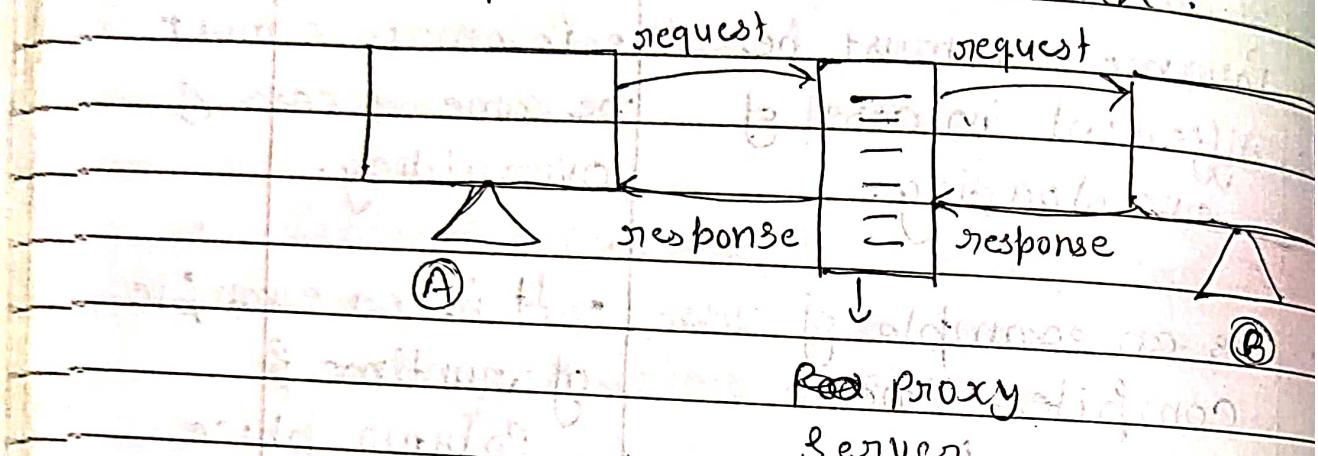
- Return type must be same in overriding.

- OVERRIDING does not involve static methods.



Q8. what are Proxy Servers? Explain the usage of anonymous proxy servers in designing mailing applications.

Q. Proxy Server is another computer on the network which act as intermediary between client or server, or between one computer to another computer in the network.



\* Proxy Server has following uses:-

- Caching :- Cache the frequently accessed web pages to improve the response time for clients accessing those web pages.
- Logging :- can be used for logging the traffic going in and out of the network.
- Compression :- The proxy can optimise and

compress the content to speed up the load time.

Q9. How does Servlet differ from Applet?

Discuss all the phases of a Servlet lifecycle.

#### A9. Diff Applets & Servlets

Applets	Servlets
• Applets are executed on client-side i.e. applet run within a web browser on the client machine.	• Servlets are executed on server-side i.e. Servlet runs on the web page on server.
• Parent Package of Applet includes info.	• Parent Package of Applet includes Java applet*.
• Important methods of applet includes init(), stop(), paint().	• Lifecycle methods of servlet are init(), service(), and destroy().

\* All Phases of Servlet Lifecycle :-

- 1). init method is invoked
- 2). service method is invoked

3). destroy method is invoked.

4). Servlet Class is loaded :- The class loader is responsible to load the Servlet class. The servlet class is loaded when the first request for the Servlet is received by the web container.

5). Servlet instance is created :-

The web container creates the instance of a servlet after loading the servlet class. The servlet instance is created only once in the servlet life cycle.

Q10. Write a Program in Java to copy the text content of one file into another file. Support your program with suitable comments.

Ans. import java.io.\*;  
class copyfile  
{

    public static void main (String [] args)  
    throws IOException {

```

fileInputStream ri=new FileInputStream("");
fileOutputStream wo=new FileOutputStream("");
int i;
while ((i=ri.read())!= -1)
{
    wo.write((char)i);
}
System.out.println("Data copied successfully");
}
}

```

Q11. what is StringBuffer class? Write a program in Java to append a given string to a String Buffer object.

- Ans.
- Java StringBuffer class is used to create mutable string objects.
  - The StringBuffer class in Java is the same as String class except it is mutable it can be changed.
  - It creates a StringBuffer with the specified string.

Ex:-

```
public class StringBuffer Append  
public static void main(String args)  
{
```

```
    StringBuffer sb1 = new StringBuffer  
    ("string");
```

```
    System.out.println ("buffer value,"  
    + sb1);
```

```
    char[] str = { 'a', 'b', 'c' };
```

```
    sb1.append (str);
```

```
    System.out.println ("after append :" +
```

```
    sb1);
```

```
}
```

```
}
```

Q12. Write a Program to Pass Parameters  
to an applet using a Web Page. Also  
write the Phases of an Applet  
Lifecycle.

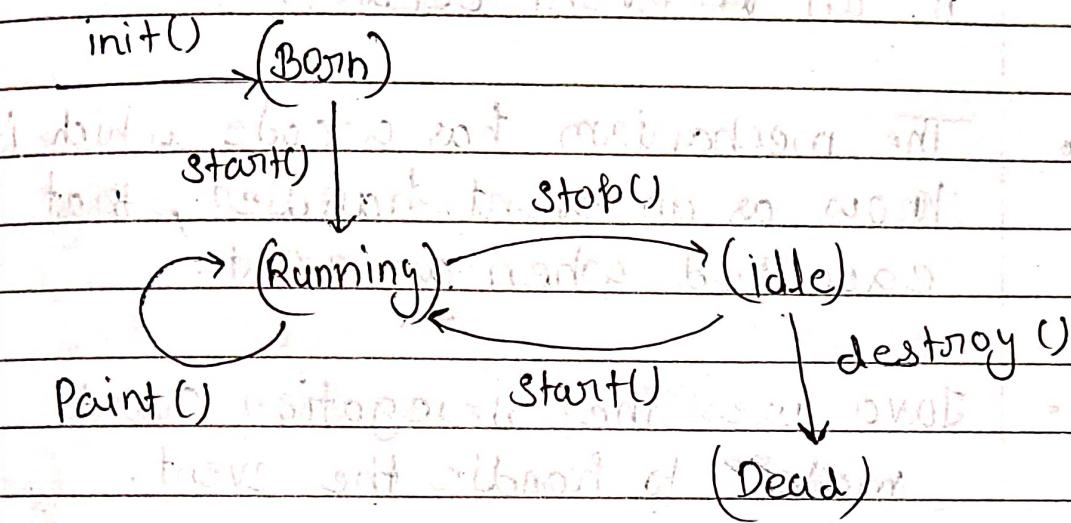
Ans. Import java.applet.\*;  
Import java.awt.\*;

```
Public class Myapplet extends  
Applet {
```

```
    Public void paint (Graphics g)
```

```
    {  
        String str = this.getParameter  
        ("msg");
```

g.drawString("Star", 100, 80);  
 }  
 } // This will give different output  
 // Go to the next chapter for  
\* Applet Life Cycle



Q13. What is an event in Java? How does Java handle events? Write a program in Java to capture any event generated by keyboard.

\* what is an Event \*

- change in the state of an object is known as Event.

- Event describes the change in the state of the source.

- Events are generated as a result of user interaction with the graphical user interface components.

Ex:- clicking on a button, moving the mouse.

## \* Handling Event \*

- Event handling is the mechanism that controls the event and decides what should happen if an ~~ve~~ event occurs.
- The mechanism has a code which is known as an event handler, that is executed when an event.
- Java uses the delegation event model to handle the event.

Q4. what is an Exception? Briefly explain the causes of exception. Describe how multiple exceptions are caught in Java, with the help of a suitable program code.

An Exception :-

- An exception is caused by our program.
  - Exceptions are recoverable.
- In Java, exceptions are classified as checked or unchecked type.

Ex:-

```

class main {
    public static void main (String [] args) {
        try {
            int array [] = new int [10];
            array [10] = 30 / 0;
        } catch (Exception e) {
            System.out.println ();
        }
    }
}

```

Q15. Write a Java program to print Fibonacci series, upto the  $n^{\text{th}}$  term entered by the user. Support your program with suitable comments.

A) import java.util.Scanner;

class A

{

```

public static void main (String [] args) {
    int term, a=0, b=1, c;
    System.out.print ("Enter term");
    Scanner n = new scanner (System.in);
    term = n.nextInt ();
    for (int i=1; i<=term; i++) {
        System.out.print (a + " ");
        c = a + b;
        a = b;
        b = c;
    }
}

```

$c = a + b;$

$a = b;$

$b = c;$

}

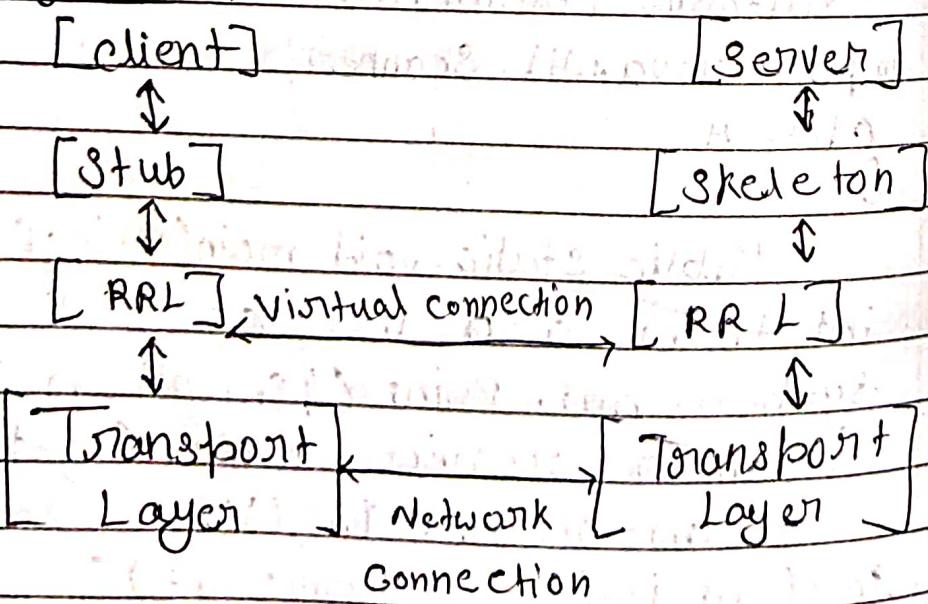
}

}

Q16. Explain the Java RMI architecture, with the help of a diagram.

- Ans. Inside the Server Program, a remote object is created and reference of that object is made available for the client.
- The client programme requests the remote objects on the server and tries to invoke its methods.

\* Diagram



MCS 024 Dec-2022

Q1. what is method overloading? Explain with suitable example.

Ay. whenever a class contain more than one method with same name and different types of Parameters called method overloading.

Syntax :- return-type method-name(para1);  
 " " " " (para, para);

Ex:-

```
class Adder {
    static int add(int a, int b) { return a+b; }
```

```
} // indicates end of class definition
```

```
class Testoverloading3 {
    public static void main (String [] args) {
        System.out.println (Adder.add(11, 11));
```

```
} // indicates end of main method
```

Q2. Explain the relationship between inheritance and polymorphism through an example.

Ay.

Ans:-Inheritance

- It is a part of object-oriented Programming Paradigm.
- It can be implemented in C++, Python and other object oriented programming languages.
- It helps to reuse the code.

- Types of inheritance
  - single inheritance
  - multi-level inheritance
- It can be used in Pattern design.

Polymorphism

- 'Poly' means multiple and 'morph' means forms.

- It is part of object-oriented programming paradigm.

- This can be used while using functions.

- Types of Polymorphism
  - compile-time
  - run-time

- It can be used in Pattern design.

- Q3. Distinguish between 'final', 'finally' and 'finalize' keywords. give example for each.

### Ans Final \*

- It is a keyword
- It can't be inherited
- It cannot be overridden
- final methods cannot be inherited by any class

### \* finally \*

- It is a block or set of code
- It is used to place important code in this block
- It gets executed irrespective of whether the exception is handled or not.

### \* finalize \*

- It is a method
- It is used to perform clean up processing right before the object is collected by garbage collector.

Q4. what is Java applet & How is it different from Java application programs?

Ans.

\* Application :-

- They are similar to Java Programs.
- It requires a 'main' function for it to be executed.
- Java applications have full access to local file system and network.
- They can execute the Programs with the help of the local system.
- They can be executed independently without using web browser.

Q.

Applets :-

- They are small Java Programs.
- They need a java enabled web browser to be executed.
- It doesn't need a main function to get executed.
- It doesn't have local disk and network access.
- They can't access the local system.

Q.S.

what is Java bean? Give advantages of Java beans in programming.

Ans. It provides a default no-arg.

Q. Java Bean:-

- It provides a default, no-argument constructor.
- It should be Serializable and that which can implement the Serializable interface.
- It may have a number of properties which can be read or written.

Q6. How String Class differs from String Buffer class? Explain with suitable example.

Ans. String Class	String Buffer & class
• The String class is immutable.	• The String Buffer class is mutable.
• String is slow and consumes more memory.	• String Buffer is fast and consumes less memory.
• Both String class overrides the equals() method of objects class.	• String buffer class doesn't override the equals() method of object class.
• String class is slower while performing concatenation operation.	• String buffer class is faster performing.

- String class uses string constant pool.

- String buffer uses heap memory.

Q7. Explain Get and Post methods of Servlet Programming, with the help of suitable code.

Ans.

Get

Post

- In case of Get request, only limited amount of data can be sent because data is sent in header.

- In case of Post request large amount of data can be sent because data is sent in body.

- Get request is not secured because data is exposed in URL bar.

- Post request is secured because data is not expose in url.

- Get request can be bookmarked.

- Post request cannot be bookmarked.

- Get request is P. idempotent.

- Post request is non-idempotent.

- Get request is more efficient and used more than Post.

- Post request is less efficient and used less than get.

- Q8. Write a Java program to create a file named 'ignou.txt' and write 'Hello Ignou' in it.

```

Ans.
class main {
    public static void main (String [] args) {
        File file = new File ("Java file.java");
        try {
            boolean value = file.createNewFile();
            if (value) {
                System.out.println ("New java file is created.");
            } else {
                System.out.println ("The file already exists.");
            }
        } catch (Exception) {
            e.printStackTrace();
        }
    }
}
  
```

- Q9. Write a Java Program for 'Waiting output on console' using `PrintWriter` method. Given suitable comments for readability of your program.

```

Ans.
import java.io.PrintWriter;
public class PrintWriterDemo {
  
```

Public static void main(String [] args)  
throws Exception {

PrintWriter ConsoleOutput = new PrintWriter  
System.out;

ConsoleOutput.Println("Hello world");

" " . Print (" " " " " );

" " . Println (" " " " " );

" " . append (" " " " " );

~~we are doing~~  
ConsoleOutput.Flush();

" " . Close();

}

}

Q10. ~~Whatever~~ Write a Program in Java, to  
show the concept of exception handling  
~~sp.~~ Support your program with suitable  
comments.

Ans. Public class JavaExceptionExample {  
Public static void main(String args){  
try{  
// code that may raise exception  
int data = 100/0;  
} catch(ArithmeticException e){ System  
out.println(e); }  
// test code of the program

```
System.out.println("rest of the code...");  
}
```

Q11. Write a Java Program to find factorial of a number entered by user.

Ans. `import java.util.*;`

public class factorialLoop {

```
public static void main(String args[]) {  
    int num, factorial = 1, i;
```

~~Scanner~~ Scanner in = new Scanner(system.in);

```
System.out.print("Enter an Integer");
```

num = in . neatInt();

2

~~for (i=1 ; i<=num ; i++) {~~

factorial = factorial = i;

2

```
System.out.printIn("!" + num + "=" +  
    factorial);
```

3

1

Q12. Compare object oriented Programming and structured Programming. Give advantages of object oriented Programming. Given advantages of object oriented Programming over the structured programming.

## A) Structured Programming

- It is a subset of Procedural programming.

- Programs are divided into small programs or function.

- It generally follows "Top-Down Approach".

- It gives more importance of code.

## Object - Oriented Programming

- It relies on concept of objects that contain data and code.

- Programs are divided into objects or entities.

- It generally follows "Bottom-up Approach".

- It gives more importance to data.

### \* Advantages of OOP :-

- Modularity for easier troubleshooting
- Reuse of code through inheritance
- Flexibility through Polymorphism
- Effective problem solving.

## Q. Advantages of Structured programming :-

- It is user friendly and easy to understand.
- It is easier to learn.
- They require less time to write.
- They are easier to maintain.

MCS-024 Dec - 2021

Q1. Compare Data abstraction and data hiding. Give an example.

Ans.

Abstraction

Data Hiding

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>The process of hiding the implementation details and showing the functionality of program.</li><li>Abstraction helps in extracting relevant information from a large set of information.</li><li>Abstraction focuses on reducing the complexity of code.</li><li>Abstraction solves the design level problems.</li></ul> | <ul style="list-style-type: none"><li>The process of hiding important and sensitive data from any unauthorised access is known as data hiding.</li><li>Data hiding helps to increase safety by preventing outside attacks.</li><li>The purpose of data hiding is to achieve data.</li><li>Data hiding solves the implementation level problem.</li></ul> |
|--|--|

Q2. What/ky any write any three actions that can be taken after an exception occurs in a program.

Ans.

i). Checked Exception:- The classes that directly inherit the Throwable class except Runtime Exception and Error are known as checked exceptions. checked exceptions are checked at compile time.

2). unchecked Exception:- The classes that inherit the Runtime exception are known as unchecked exceptions. unchecked they are checked at runtime.

3). Error:- Error is irrecoverable. Some examples of errors are out of memory error, Virtual machine error, Assertion error etc.

Q3. what are threads ? Explain how threads are created by implementing Runnable Interface.

### Ans. Threads :-

- one of the exciting features of windows operating system is that it allows the user to handle multiple tasks together.
- This facility in windows operating system is called multitasking.
- in java we can write the programs that perform multitasking using the multithreading concept.
- It is sometimes called as light-weight process.

### \* implementing Runnable Interface

- The thread can also be created using runnable interface.

- 1). If a class extends a thread class then it can not extends any other class. It may be required to extend.
- 2). if a class thread is extended then all its functionalities get inherited.

Q4. what is serialization ? Differentiate between Transient and volatile keyword.

A4. Serialization :-

- useful to re-create objects into its original state.
- Convert object to stream of bytes for easy shipment of information.

\* Difference

*	volatile		Transient
• volatile Keyword is used to flush changes directly to the main memory.		• transient Keyword is used to exclude variable during serialization.	
• volatile are not initialized with a default value.		• transient variables are initialized with a default value.	
• volatile Can be used with a static variable.		• Transient cannot be used with the static keyword.	
• volatile can be used with the final keyword.		• Transient can not be used with the final keyword.	

Q5. What is RMI ? Which Protocol does it use ? Discuss the security problems in RMI .

RMI :-

Ans. The remote method invocation (RMI) is a remote object invocation technique used to locate and fetch the objects at the remote side using object references.

- The result is passed all the way back to the client.

Q6. What is session tracking ? Discuss the mode of cookies in session tracking .

Ans. Session tracking means in a particular interval of time.

- Session tracking is a way to maintain state of an user.
- HTTP Protocol is stateless, so we need to maintain state using session tracking techniques.
- So we need to maintain the state of an user to recognize to particular user.

### Q6. Cookies in Session Tracking \*

- Cookies are the textual information which are stored in key value pair format to the clients browser during multiple requests.
- To make Cookies just create objects of Cookie class and pass name and its value.
- There is a cookie class in java present in `java.servlet.http` package.
- To add cookie in response just use addCookie method of ~~response~~ interface.

Q7. What is Java Bean? Briefly discuss the features of Java Beans. How does Java Bean differ from an instance of a normal Java class.

- It provides a default, no-argument constructor.
- It should be Serializable and that which can implement the Serializable Interface.

- It may have a number of properties which can be read or written.
- It may have a number of "getter" and "setter" methods for the properties.

Q8. what is synchronization . Why is it important . Explain the use of synchronized method in multithreading .

- Ans. Synchronization :-
- synchronization in java is the capability to control the access of multiple threads to any shared resource.
  - synchronization is better option where we want to allow only one thread to access the shared resource.

\* Top Importance.

- To prevent thread interference.
- " " Consistency problem .

Q8. Synchronized method

- If you declare any method as synchronized, it is known as synchronized method.
- Synchronized method is used to lock an object for any shared resource.

Q9. What is the difference between & operator and the && operator? Give suitable example for each.

A1. " & " operator	" && " operator
It is a bitwise operator.	It is a logical operator.
It evaluates the left and right side of the expression.	It evaluates the left side of the expression only.
It operates on the 'Boolean' data type.	It operates on 'Boolean' data type only.
It also operates on bits.	It does not operate on bits.
It is used to check conditions.	It is used to check logical conditions.

Q10. what is a Constructor ? Explain the use of constructor with the help of a program.

- A. Constructor is a special type of method whose name is same as class name.
- Every Java class has a constructor.
  - A constructor is automatically called at the time of object creation.
  - A constructor never contain any return-type including void.

Eg:-

```
import java.io.*;
class Greeks
{
    Greeks()
    {
        Super();
        System.out.Println("Hello");
    }
}
```

```
Public static void main(String[] args)
{
```

```
    Greeks geek = new Greeks();
}
```

```
}
```

- Q11. Compare checked exceptions with unchecked exception. Give an example for each.

checked exception	unchecked exception
<ul style="list-style-type: none"><li>checked exception at compile time when the source code is transformed into an executable code.</li></ul>	<ul style="list-style-type: none"><li>unchecked exception at runtime when the executable program starts running.</li></ul>
<ul style="list-style-type: none"><li>The checked exception is checked by the compiler.</li></ul>	<ul style="list-style-type: none"><li>These type of exception are not checked by the compiler.</li></ul>
<ul style="list-style-type: none"><li>checked exception can be created manually.</li></ul>	<ul style="list-style-type: none"><li>They can also be created manually.</li></ul>
<ul style="list-style-type: none"><li>This exception is counted as a subclass of the class.</li></ul>	<ul style="list-style-type: none"><li>This exception happen in runtime and it is not included in the exception class.</li></ul>

- Java virtual machine requires the exception to be caught and handled.
- Java virtual machine does not need the exception to be handled.

## Q12. AWT and Swing

Aw

AWT

Swing

- | AWT  | Swing  |
|--|--|
| The components of Java AWT are heavy weighted. | The components of java swing are light weighted. |
| The execution time of AWT is more than swing.  | The execution time of swing is less than AWT.    |
| MVC pattern is not supported by AWT.           | MVC pattern is supported by swing.               |
| AWT provides less powerful components.         | Swing provides more powerful components.         |
| AWT components require java.awt package.       | Swing components requires javax.swing package.   |