**Time allowed: 90 Minutes Max. Marks: 40**

**General Instructions:**

* **Follow the instructions given in each section.**
* **Make sure that you attempt the questions in order.**

**SECTION-A (10\*1 mark=10 marks)**

***(All questions are compulsory)***

1) Which of these classes is used for input and output operation when working with bytes?

**a) InputStream**

b) Reader

c) Writer

d) All of the mentioned

2) Which of these class is used to read and write bytes in a file?

a) FileReader

b) FileWriter

**c) FileInputStream**

d) InputStreamReader

3) Which of the following method is static and synchronized in JDBC API?

**a) getConnection()**

b) prepareCall()

c) executeUpdate()

d) executeQuery()

4) Which methods are required to load a database driver in JDBC?

a) getConnection()

b) registerDriver()

c) forName()

**d) Both b and c**

5) What is meant by the term generics?

a) class

b) structure

c) interface

**d) parameterized types**

6) Which of the following allows us to call generic methods as a normal method?

a) Interface

b) Inner class

**c) Type Interface**

d) All of the mentioned

7) Which of these methods sets every element of a List to a specified object?

**a) fill()**

b) add()

c) set()

d) Complete()

8) Collection stores only ?

**a) object type data**

b) string type data

c) primitive type data

d) All of the above

9) Which type of exception is thrown if you try to add an element to an already full Collection ?

a) ClassCastException

b) NullPointerException

**c) IllegalStateException**

d) IllegalArgumentException

10) What does get(int index) method define by List interface do ?

a) stores an object at the specified index

b) returns a list containing elements between specified index and end in the collection.

**c) returns an object stored at the specified index**

d) none of the above.

**SECTION-B (5\*2 mark=10 marks)**

***(All questions are compulsory)***

11) Select the correct output of the execution of the below program:

public static void main(String[] args) {

SortedSet ss=new TreeSet();

ss.add("a");

ss.add("b");

ss.add("c");

ss.add("d");

ss.add("e");

ss.add("f");

ss.add("g");

SortedSet ss2=ss.headSet("e");

Iterator ssitr2=ss2.iterator();

while(ssitr2.hasNext())

{

System.out.println(ssitr2.next().toString());

}

}

a) a,b,c,d,e

**b) a,b,c,d**

c) a,b,c,d,e,f,g

d) Run time exception

12) Select the correct output of the execution of the below program:

public static void main(String[] args) {

SortedSet ss=new TreeSet();

ss.add("a");

ss.add("b");

ss.add("c");

ss.add("d");

ss.add("e");

ss.add("f");

ss.add("g");

SortedSet ss2=ss.tailSet("e");

Iterator ssitr2=ss2.iterator();

while(ssitr2.hasNext())

{

System.out.println(ssitr2.next().toString());

}

}

**a) e,f,g**

b) f,g

c) Run-time exception

13) What will be the output of the following program?

public class GenericsWithObjectsDemo {

public static void main(String args[])

{

GenericsWithObjects<double> doubleObject = new GenericsWithObjects<double>(12.0);

doubleObject.print();

}

}

class GenericsWithObjects<T>

{

T obj;

GenericsWithObjects(T obj)

{

this.obj = obj;

}

void print()

{

System.out.println(obj);

}

}

a) 12.0

b) Some other output

**c) Compilation Error**

d) Runtime Error

14)

try{

File f = new File("a.txt");

}catch(Exception e){

}catch(IOException io){

}

Is this code create new file name a.txt ?

a) true

b) false

**c) Compilation Error**

d) None of these

15) What will be output for the following code?

import java.io.\*;

class files

{

public static void main(String args[])

{

File obj = new File(""/java/system"");

System.out.print(obj.getName());

}

}

a) java

**b) system**

c) java/system

d) /java/system

**SECTION-C(Coding Question) (2x5 marks=5 marks)**

Q16) Write a generic class which is bounded to accept only integer type variables

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Test Case 1** | **Test Case 2** | **Test Case 3** |
| **Input** | “ab” | 20.22d | 125.332f |
| **Output** | ERROR | Data value is:20.22 | Data value is 125.332 |

Solution :

**class Sample <T extends Number>{**

**T data;**

**Sample(T data){**

**this.data = data;**

**}**

**public void display() {**

**System.out.println("Data value is: "+this.data);**

**}**

**}**

**public class JavaProgram {**

**public static void main(String args[]) {**

**Sample<Integer> obj1 = new Sample<Integer>(20);**

**obj1.display();**

**Sample<Double> obj2 = new Sample<Double>(20.22d);**

**obj2.display();**

**Sample<Float> obj3 = new Sample<Float>(125.332f);**

**obj3.display();**

**}**

**}**

Q17)Write Java program to copy content from one file to another.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Test Case 1** | **Test Case 2** | **Test Case 3** |
| **Input** | File1=”hello world” | File1=”this is java” | File1=”abcdefg 12345” |
| **Output** | File2=”hello world” | File2=”this is java” | File2=”abcdefg 12345” |

Solution :

**import java.io.\*;**

**import java.util.\*;**

**public class JavaProgram {**

**public static void copyContent(File a, File b)**

**throws Exception**

**{**

**FileInputStream in = new FileInputStream(a);**

**FileOutputStream out = new FileOutputStream(b);**

**try {**

**int n;**

**// read() function to read the**

**// byte of data**

**while ((n = in.read()) != -1) {**

**// write() function to write**

**// the byte of data**

**out.write(n);**

**}**

**}**

**finally {**

**if (in != null) {**

**// close() function to close the**

**// stream**

**in.close();**

**}**

**// close() function to close**

**// the stream**

**if (out != null) {**

**out.close();**

**}**

**}**

**System.out.println("File Copied");**

**}**

**public static void main(String[] args) throws Exception**

**{**

**Scanner sc = new Scanner(System.in);**

**// get the source file name**

**System.out.println(**

**"Enter the source filename from where you have to read/copy :");**

**String a = sc.nextLine();**

**// source file**

**File x = new File(a);**

**// get the destination file name**

**System.out.println(**

**"Enter the destination filename where you have to write/paste :");**

**String b = sc.nextLine();**

**// destination file**

**File y = new File(b);**

**// method called to copy the**

**// contents from x to y**

**copyContent(x, y);**

**}**

**}**

**SECTION-D (Coding Question)(1x10 mark=10 mark)**

Q18) Given an array arr[] of distinct positive elements, the task is to find the number of unique pairs (a, b) such that a is the maximum and b is the second maximum element of some subarray of the given array.

**Input**: arr[] = {1, 2, 3}

**Output**: 2

{1, 2}, {2, 3}, {1, 2, 3} are the subarrays and the pairs satisfying given conditions are (2, 1) and (3, 2) only.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Test Case 1** | **Test Case 2** | **Test Case 3** |
| **Input** | arr[] = {4, 1, 2} | arr[] = {7, 8, 9,4,5} | arr[] = {2, 1, 7,96} |
| **Output** | 3 | 5 | 4 |

Solution :

**import java.util.Stack;**

**class JavaProgram**

**{**

**// Function to return the count of the required pairs**

**static int countPairs(int arr[], int n)**

**{**

**// Calculating the valid pairs in forward direction**

**int forward[] = new int[n];**

**Stack<Integer> sForward = new Stack<Integer>();**

**for (int i = 0; i < n; i++)**

**{**

**while (!sForward.empty()**

**&& arr[i] > arr[(Integer)sForward.peek()])**

**{**

**forward[(Integer)sForward.peek()] = 1;**

**sForward.pop();**

**}**

**sForward.push(i);**

**}**

**// Calculating the valid pairs in backward direction**

**int backward [] = new int[n] ;**

**Stack<Integer> sBackward = new Stack<Integer>() ;**

**for (int i = n - 1; i >= 0; i--)**

**{**

**while (!sBackward.empty()**

**&& arr[i] > arr[(Integer)sBackward.peek()])**

**{**

**backward[(Integer)sBackward.peek()] = 1;**

**sBackward.pop();**

**}**

**sBackward.push(i);**

**}**

**// Calculating the total number of pairs**

**int res = 0;**

**for (int i = 0; i < n; i++)**

**{**

**res += forward[i] + backward[i];**

**}**

**return res;**

**}**

**public static void main (String[] args)**

**{**

**int arr[] = { 1, 2, 3, 4, 5 };**

**int n = arr.length;**

**System.out.println(countPairs(arr, n));**

**}**

**}**