

ICSE Paper 2012

COMPUTER APPLICATIONS

(Two Hours)

*Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.*

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

This paper is divided into two Sections.

*Attempt **all** questions from **Section A** and **any four** questions from **Section B**.
The intended marks for questions or parts of questions are given in brackets [].*

Section 'A' (40 Marks)

*(Attempt **all** questions)*

Question 1:

(a) Give one example each of a primitive data type and a composite data type. [2]

(b) Give one point of difference between unary and binary operators. [2]

(c) Differentiate between call by value or pass by value and call by reference or pass by reference. [2]

(d) Write a Java expression for $2as + u^2$ [2]

(e) Name the type of error (syntax, runtime or logical error) in each case given below :

- (i) Division by a variable that contains a value of zero.
- (ii) Multiplication operator used when the operation should be division.
- (iii) Missing semicolon. [2]

Answer:

(a) Primitive data type: int
Composite data type: Class

(b) Unary operators work on a single operand.
Binary operators act on two operands.

(c) Call by Value: Actual parameters are copied into the formal parameters and the called method works with the formal parameters. Any change in the formal parameter is not reflected back in the actual parameter.

Call by reference: When a method is called, the reference/address on which the data is stored is sent to the formal parameters. Any change in formal parameters is reflected in the actual parameters.

(d) `Math.sqrt((2*a*s) + u*u);`

- (e) (i) runtime error.
- (ii) logical error
- (iii) Syntax error

Question 2:

- (a) Create a class with one integer instance variable. Initialize the variable using:
 - (i) default constructor.
 - (ii) parameterized constructor. [2]
- (b) Complete the code below to create an object of Scanner class :
Scanner sc = Scanner (.....). [2]
- (c) What is an array ? Write a statement to declare an integer array of 10 elements. [2]
- (d) Name the search or sort algorithm that :
 - (i) Makes several passes through the array, selecting the next smallest item in the array each time and placing it where it belongs in the array.
 - (ii) At each stage, compares the sought key value with the key value of the middle element of the array. [2]
- (e) Differentiate between public and private modifiers for members of a class. [2]

Answer:

```
(a) class Test
{ int n;
  Test ( )
  {n=0; }
  Test (int nn)
  {n=nn;}
}
```

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

(c) An array is a group of similar type variables that are referenced by a common name.
int arr = new int [10];

(d) (i) Selection sort
(ii) Binary search

(e) Public Modifiers: Public members of a class are available to all the classes of all the packages.
Private Modifiers: Private members of a class are accessible only within the class.

Question 3:

(a) What are the values of x and y when the following statement are executed ?
int a =63, b=36;
boolean x=(a>b)?true:false;
int y=(a<b)?a:b; [2]

(b) State the values of n and ch.

```
char c='A';
```

```
int n=c+1;
```

```
char ch=(char)n; [2]
```

(c) What will be the result stored in x after evaluating the following expression ?

```
int x=4; x+=(x++)+(++x)+x; [2]
```

(d) Give the output of the following program segment :

```
double x=2.9, y=2.5;
```

```
System.out.println(Math.min(Math.floor(x),y));
```

```
System.out.println(Math.max(Math.ceil(x),y)); [2]
```

(e) State the output of the following program segment :

```
String s="Examination";
```

```
int n=s.length();
```

```
System.out.println(s.startsWith(s.substring(5,n)));
```

```
System.out.println(s.charAt(2)==s.charAt(6)); [2]
```

(f) State the method that:

(i) Converts a string to a primitive float data type.

(ii) Determines if the specified character is an uppercase character. [2]

(g) State the data type and values of a and b after the following segment is executed.

```
String s1="Computer", s2="Applications";
```

```
a=(s1.compareTo(s2));
```

```
b=(s1.equals(s2)); [2]
```

(h) What will the following code output ?

```
String s="malayalam";
```

```
System.out.println(s.indexOf('m'));
```

```
System.out.println(s.lastIndexOf('m')); [2]
```

(i) Rewrite the following program segment using while instead of for statement,

```
int f=1,i;
```

```
for(i=1; i<=5; i++)
```

```
{f*=i; System.out.println(f);} [2]
```

(j) In the program given below, state the name and the value of the

(i) method argument or argument variable

(ii) class variable

(iii) local variable

(iv) instance variable

[2]

```
class myClass {  
    static int x=7;  
    int y=2;  
    public static void main(String args[]){  
        myClass obj = new myClass();  
        System.out.println(x);  
        obj.sampleMethod(5);  
        int a=6;  
        System.out.println(a);  
    }  
    void sampleMethod(int n){  
        System.out.println(n);  
        System.out.println(y);  
    }  
}
```

Answer:

(a) x = true

y = 36

(b) n = 66

ch = B

(c) x = 20

(d) 2.0

3.0

(e) False True.

(f) (i) Float.valueOf (<string>);

(ii) Character.toUpperCase (<character>);

(g) int, a = 2

boolean, b = false

(h) 0

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(i) int f = 1, i = 1;

while (i <= 5)

{ f* = i;

```
System.out.println(f);  
i++; }
```

- (j) (i) n
(ii) x
(iii) a
(iv) y

SECTION B (60 Marks)

*Attempt **any four** questions from this Section.*

The answers in this Section should consist of the Programs in either Blue J environment or any program environment with Java as the base.

Each program should be written using Variable descriptions /Mnemonic Codes so that the logic of the program is clearly depicted.

Flow-Charts and Algorithms are not required.

Question 4:

Define a class called Library with the following description :

Instance variables/data members :

int acc_num — stores the accession number of the book

String title — stores the title of the book

String author — stores the name of the author

Member methods:

(i) void input () — To input and store the accession number, title and author.

(ii) void compute () — To accept the number of days late, calculate the display the fine charged at the rate of Rs. 2 per day.

(iii) void display() — To display the details in the following format:

Accession Number Title Author

Write a main method to create an object of the class and call the above member methods. **[15]**

Answer:

```
import java.io.*;
class library
{int acc_num;
String title;
String author;
void input ( ) throws IOException
{BufferedReader br = new BufferedReader (new InputStreamReader (System.in));
System.out.println ("Enter accession number");
acc_num = Integer.parseInt(br. readLine());
System.out.println("Enter title of the book");
title = br. readLine();
System.out.println ("Enter author of the book");
author = br.readLine();
}
void compute(int days)
{int Fine;
fine = 2*days;
System.out.println("fine charged=" +fine);
}
void display()
{
System.out.println("Accession Number"+"\\t" + "Title"+"\\t" + "Author");
System.out.println(acc_num +"\\t" + title + "\\t" + author);
}
public static void main ( ) throws IOException
{ Library obj = new Library ();
obj.input ()
obj.compute (4);
obj.display ();

}
}
```

Question 5:

Given below is a hypothetical table showing rates of Income Tax for male citizens below the age of 65 years :

Taxable Income (TI) in Rs.	Income Tax in Rs.

Does not exceed Rs. 1,60,000	Nil
Is greater than Rs. 1,60,000 and less than or equal to Rs. 5,00,000	$(TI - 1,60,000) \times 10\%$
Is greater than Rs. 5,00,000 and less than or equal to Rs. 8,00,000	$[(TI - 5,00,000) \times 20\%] + 34,000$
Is greater than Rs. 8,00,000	$[(TI - 8,00,000) \times 30\%] + 94,000$

Write a program to input the age, gender (male or female) and Taxable Income of a person.

If the age is more than 65 years or the gender is female, display “wrong category”.

If the age is less than or equal to 65 years and the gender is male, compute and display the Income Tax payable as per the table given above. **[15]**

Answer:

```
class tax
{
    int age; char g; int income; double it_tax;
    public static void main ( ) throws IOException
    {
        BufferedReader rd = new BufferedReader (new InputStreamReader (system.in));
        System.out.println ("Enter Age, gender, Taxable Income of a person");
        age = Integer.parseInt(rd.readLine ( ));
        g = (char) rd.read ( );
        income = Integer.parseInt (rd.readLine ( ));
        if (age > 65 || g == 'f')
        {
            it_tax = 0;
            System.out.println ("wrong category");
        }
        else if (age <= 65 // g == 'm')
        {
            if (income <= 160000)
                it_tax = 0;
            else if (income > 160000 && income <= 500000)
                it_tax = ((income - 160000) * 10)/100;
            else if (income > 500000 && income <= 800000)
                it_tax = ((income - 500000) * 20)/100 + 34000;
            else if (income > 800000)
                it_tax = ((income - 800000) * 30)/100 + 94000;
        }
        System.out.println ("Income tax in Rs. =" + it_tax);
    }
}
```

Question 6:

Write a program to accept a string. Convert the string to uppercase. Count and output the number of double letter sequences that exist in the string.

Sample Input: "SHE WAS FEEDING THE LITTLE RABBIT WITH AN APPLE"

Sample Output: 4 [15]

Answer:

```
class str_op
{
public static void main ( ) throws IOException
{
    BufferedReader br = new BufferedReader (new InputStreamReader (system.in));
    System.out.println ("Enter any string :");
    str 1 = br.readLine ( );
    String str1=str.to UpperCase ();
    str1 = str1.trim ( );
    int i, c, l;
    char ch1, ch2;
    l=str.length();
    for (i=0; i < l; i++)
    {ch1 =str1.charAt(i);
    ch2 = str2.charAt (i+1);
    if (ch1== ch2)
    C++;}
    System.out.println("Total number of double letter sequence="; +C);
} }
```

Question 7:

Design a class to overload a function polygon() as follows

- (i) void polygon(int n, char ch) — with one integer argument and one character type argument that draws a filled square of side n using the character stored in ch.
- (ii) void polygon(int x, int y) — with two integer arguments that draws a filled rectangle of length x and breadth y, using the symbol '@'.
- (iii) void polygon() — with no argument that draws a filled an angle shown below.

Example :

- (i) *Input value of n=2, ch='O'*

Output : O O
 O O

- (ii) *Input value of x=2, y=5*

Output : @@@@@
 @@@@@

- (iii) *Output :* *

 **

Answer:

```

class overload
{void Polygon (int n, char ch)
{int i, j;
for (i=1; i<=n; i++)
{for (j=1; j<=n; j++)
{System.out.print(ch);}
System.out.println();}
}
void Polygon (int x, int y)
{int i, j;
for (i=1; i<=y; i++)
{for (j=1; j<=x; j++)
{System.out.print('@');}
System.out.println();}
}
void Polygon ()
{int i, j;
for (i=1; i<=3; i++)
{for (j=1; j<=i; j++)
{System.out.print("*");}
System.out.println();}
}
}

```

Question 8:

Using the switch statement, write a menu driven program to :

(i) Generate and display the first 10 terms of the Fibonacci series 0, 1, 1, 2, 3, 5.....

The first two Fibonacci numbers are 0 and 1, and each subsequent number is the sum of the previous two.

(ii) Find the sum of the digits of an integer that is input.

Sample Input: 15390

Sample Output : Sum of the digits =18

For an incorrect choice, an appropriate error message should be displayed. **[15]**

Answer:

```
import java.io.*;
class menu
{
    public static void main ( ) throws IOException
    {
        BufferedReader br=new BufferedReader (new InputStreamReader (System.in));
        System.out.println("Enter 1 for Fibonacci series");
        System.out.println("Enter 2 for Sum of the digits");
        System.out.println("Enter Choice");
        int ch = Integer.parseInt (br.readLine());
        switch (ch)
        {
            case 1 :
                int i =0, j=1, s=0;
                System.out.println(i);
                System.out.println(j);
                for (int t =1; t<=8; t++)
                {s=i+j;
                System.out.println(s);
                i=j;
                j=s;
                }
                break;

            case 2 :
                System.out.println("Enter any integer");
                int n = Integer.parseInt(br. readLine());
                while (n != 0)
                {r = n% 10;
                s = s+r ;
                n = n/10;}
                System.out.println("Sum =" +s);
                break;
            default :
                System.out.println("Incorrect choice");
        } } }
```

Question 9:

Write a program to accept the names of 10 cities in a single dimension string array and their STD (Subscribers Trunk Dialing) codes in another single

dimension integer array. Search for a name of a city input by the user in the list. If found, display* "Search successful" and print the name of the

city along with its STD code, or else display the message "Search Unsuccessful, No such city in the list". [15]

Answer:

```
Class cities
{void main (String city_nam)
{String City [ ]={"Agra", "Delhi", "Kanpur", "Bombay", "Lucknow", "Allahabad",
"Meerut", "Varanasi", "Mathura", "Aligarh"};
int code [ ] = {0562, 0001, 0555, 0123, 0257, 0565, 0375, 0999, 0552, 0543};
int i, c=0;
for (i=0; i<=10; i++)
{if (city_nam.equalsIgnoreCase(City[i]))
{C++;
System.out.println("search successful");
System.out.println(city [i] + " " + code [i]);
}
}
if (C==0)
System.out.println("search unsuccessful, No such city in the list");
} }
```