Institute of Software Engineering

Graduate Diploma in Software Engineering

Programming Fundamentals – Assignment 07

Answer all the questions and submit your attempt on or before the given date.

01. Describe following Java statements (Use diagrams when you need):

a. int[] xr;
b. xr=new int[4];
c. System.out.println(xr);
d. System.out.println(xr[0]); //Explain the output
e. xr[0]=100;
f. xr[1]=200;
g. xr[2]=300;
h. xr[3]=400;
i. System.out.println(xr[0]+" "+xr[1]+" "+xr[2]
 +" "+xr[3]);

02. Perform the following tasks for an array called "*fractions*":

a. Declare a constant ARRAY_SIZE that's initialized to 10.
b. Declare an array with ARRAY_SIZE elements of type double, and initialize the elements to 0.
c. Refer to array element 4.
d. Assign the value 1.667 to array element 9.
e. Assign the value 3.333 to array element 6.
f. Sum all the elements of the array, using a "for-statement". Declare the integer variable x as a control variable for the loop.

03. Write Java statements to perform the following tasks:

a. To create int array to store five integer numbers.
b. To assign integers from the keyboard into the above array without using any iteration.
c. Re-write the question "b" by using a for-loop.
d. To print integers stored in the array without using any iteration.
e. Re-Write the question "d" by using a for-loop.

04. Write Java statements to accomplish each of the following tasks:

a. Display the value of element 6 of array f.
b. Initialize each of the five elements of one-dimensional integer array g to 8.
c. Total the 100 elements of floating-point array c.
d. Copy 11-element array "a" into the first portion of array "b", which contains 34 elements.
e. Determine and display the smallest and largest values contained in 99-element floating-point array "w".

05. Write Java statements to perform the following tasks:

a. To create an array and store the following numbers by using a single statement
 65, 78, 43, 89, 34, 56, 90, 23, 64, 71, 94, 29
b. To print the size of this array.
c. To print numbers in the array as follows by using traditional for-loop
 [65, 78, 43, 89, 34, 56, 90, 23, 64, 71, 94, 29]
d. To print number in the array as follows by using "for-each" loop
 [65, 78, 43, 89, 34, 56, 90, 23, 64, 71, 94, 29]
e. To print odd numbers.
 [65, 43, 89, 23, 71, 29]
f. To print even numbers.
 [78, 34, 56, 90, 64, 94]

06. Write Java statements to perform the following tasks:

a. To create an integer array with size 12,
b. To read random numbers (0 to 100), store into the array.
c. To print integers as the following format.
 e.g. [67, 90, 99, 43, 74, 27, 0, 76, 19, 45, 74, 90]
d. To print integers as the reverse format.
 e.g. [90, 74, 45, 19, 76, 0, 27, 74, 43, 99, 90, 67]
e. To find and print the sum of integers.
f. To find and print the maximum of integers.
g. To find and print the minimum of integers.
h. To find and print no of even numbers of the array.
i. To find and print no of odd numbers of the array.
j. To print the integers those hold in the even indexes (0, 2, 4, 6, . . .)
k. To print the integers those hold in the odd indexes (1, 3, 5,7, . . .)

07. Using the code fragment given bellow write the Java statement to perform following task:

```
int[] ar={1, 2, 3, 4, 5};
int[] br=new int[]{10, 20, 30, 40, 50};
```

a. To print data of "**ar**". //[1, 2, 3, 4, 5]
b. To increment elements of the array "**ar**" by 1.

c. To print array “**ar**” using method “toString” of class “Arrays”. //[[2, 3, 4, 5, 6]

d. To check and print whether both arrays are the same size or not. //”Both arrays are the same size”

e. To add each element of **br** to each element of **ar**. // [12, 23, 34, 45, 56]

f. To copy each value of **br** to **ar.** //[10, 20, 30, 40, 50]

08. The following program is designed to analyse the performance of a teacher who is teaching mathematics in several classes. The program should be able to input no of students of a particular class and after input subject marks of each student. You are given to complete this program to get the final results.

```
import java.util.*;
class Example{
    public static void main(String args[]){
        Scanner input=new Scanner(System.in);

        System.out.print("Input no of students : ");
        final int N=input.nextInt();

        //1. Create an array to store student marks

        //2. Input marks from the keyboard

        //3. find total
        int total=0;

        //4. find max;

        //5. find min

        //6. print marks [32, 45, 54, 76, ...]

        System.out.println("Total   : "+total);
        System.out.println("Maximum : "+max);
        System.out.println("Minimum : "+min);
    }
}
```

09. Complete above program (Question 8) by using Java methods

a. Create an array to store student marks
`int[] marks=createAnArray(N);`

b. Input marks from the keyboard
`readMarks(marks);`

c. Find total
`int total=total(marks);`

d. Find max;
`int max=max(marks);`

e. Find min
`int min=min(marks);`

f. Print marks [32, 45, 54, 76, ...]
`printMarks(marks);`

10. Which the following are correct array declaration:

A. int[] a;
B. int []b;
C. int e[5];
D. int c[];
E. int [d];

11. Which the following are correct array memory allocation:

A. int[] a=new int[5];
B. int[] b=new int[];
C. int[] c=[10, 20, 30, 40, 50]
D. int[] d={10, 20, 30, 40, 50}
E. int[] e=new int[]{10, 20, 30, 40, 50}
F. int[] f=new int[5]{10, 20, 30, 40, 50}
G. int[] g=new int[0];

12. Which can be insert at line 12, still code will compile?

```
class Example{
    public static void main(String args[]){
            int[] array;
            //Insert code here //Line 12
    }
}
```

A. array=new int[5];
B. array=new int[10];
C. array=new int[-5];
D. array={10, 20, 30, 40, 50};
E. array=new int[]{10, 20, 30, 40, 50};
F. array=new int[]{};

13. What are the default values each data type? Demonstrate your answer by using appropriate examples?

14. Which one of the following to get the length of given array:
int[] array={5,4,3,2,6,7,8,9,0,1};

A. array.length();
B. array.length;
C. array.size();
D. array.size;
E. array.length-1;

15. Which the following are legal Java statements: Explain your answer.

A. Int a=new int[10];
B. int b=new int[10].length;
C. int c={10,20,30,40}.length;
D. int d=new int[]{10,20,30,40}.length;

E. int e=new double[]{1.1, 1,2, 1,5, 1,4}.length;
F. int f=new int[]{10,20,30,40}[2];
G. int[] g=new int[]{10,20,30,40}[2];
H. int h=new double[]{1.1, 1,2, 1,5, 1,4}.[2];
I. int i=new double[]{1.1, 1,2, 1,5, 1,4}[2];
J. double j=new double[]{1.1, 1,2, 1,5, 1,4}.[2];

16. Which can be insert at line 10, still code will compile?

```
class Example{
    public static void main(String args[]){
        //Insert code here       //Line10
        int[] marks=new int[a];
    }
}
```

A. byte a=10;   B. short a=10;
C. int a=10;   D. long a=10;
E. float a=10;   F. double a=10;
G. char a='A';   H. int[] a=new int[10];

17. What is the output? Briefly explain your answer:

```
class Example{
    public static void increment(int x, int[] y){
        x++;
        y[0]++;
    }
    public static void main(String args[]){
        int x=100;
        int[] y={200};
        System.out.println(x+" "+y[0]);
        increment(x,y);
        System.out.println(x+" "+y[0]);
    }
}
```

18. Define Java method “merge(….)” to complete the following program to get the relevant output.

```
class Example{

    public static void main(String args[]){
        char[] vowels1={'a','e','i','o','u'};
        char[] vowels2={'A','E','I','O','U'};
        System.out.println(Arrays.toString(vowels1));
                            //[a, e, i, o, u]
        System.out.println(Arrays.toString(vowels2));
                            //[A, E, I, O, U]
        char[] vowelsAll=merge (vowels1,vowels2);
        System.out.println(Arrays.toString(vowelsAll));
                            //[a, e, i, o, u, A, E, I, O, U]
    }
}
```

19. What is the output? Explain your answer.

```
import java.util.*;
class Example{
    public static void main(String args[]){
        int[] array={100, 200, 300};
        System.out.println(Arrays.toString(array));
        for(int a : array){a++;}
        System.out.println(Arrays.toString(array));
        for(int i=0; i<array.length;i++){array[i]++;}
        System.out.println(Arrays.toString(array));
    }
}
```

20. Which can be inserted at line 10, still code will compile?

```
import java.util.*;
class Example{
    public static void printArray(int[] array){
        //body
    }
    public static void main(String args[]){
        int[] a=new int[10];
        int[] b=new int[]{10,20,30,40};
        int[] c={10,20,30,40};
        int[] d={};
        //Insert code here //Line 10

    }
}
```

A. printArray(a);   B. printArray(b);
C. printArray(c);   D. printArray(d);
E. printArray(10,20,30,40); F. printArray({});
G. printArray(new int[]{});   H. printArray(new int[5]);
I. printArray([10,20,30,40]);
J. printArray({10,20,30,40});
K. printArray(new int[]{10,20,30,40});

21. Which can be insert at line 20, still code will compile?

```
class Example{
    public static void main(String args[]){
        int x=0;
        int[] xr=new int[3];
        double d=0.0;
        double[] dr=new double[5];
        int[] grade={'a','b'};
        //Insert code here //Line 20
    }
}
```

A. x=xr[0];   B. xr[0]=x;   C. x=xr;
D. xr=x;   E. dr[0]=xr[0];   F. xr[0]=dr[0];
G. xr[0]=(int)dr[0];   H. xr=dr;
I. dr=(double[])xr;   J. dr=xr;
K. xr=(int)dr;   L. xr=(int[])dr;

22. Write an application that inputs five numbers, each between 10 and 100, inclusive. As each number is read, display it only if it's not a duplicate of a number already read. Provide for the "worst case," in which all five numbers are different. Use the smallest possible array to solve this problem. Display the complete set of unique values input after the user enters each new value. Use a one-dimensional array to solve the above problem.

23. Write a method called copyRange that takes as parameters two arrays a1 and a2, two starting indexes i1 and i2, and a length l, and copies the first l elements of a1 starting at index i1 into array a2 starting at index i2. Assume that the arguments' values are valid, that the arrays are large enough to hold the data, and so on.

24. Create a Java application to maintain a number as a **LIST**. You may use an integer array to store integer data and all number should be positive and zeros are not allowed to be input. 0's in the array is counted as no numbers input. This size of the list is equal to the no. of numbers already stored into the array. Following features (functions) should be implemented to complete the application.

a. Create a method *insert(int[] array, int number)*, which accepts two arguments (array, number). "*array*" is the created array and "*number"* is what you insert into it. Note that the given size of the array should increase if the count exceeds the size of the array.

b. Create a method called "printList(int[] array)" to print all numbers in the LIST as follows:
[23, 54, 46, 72, 72, 12, 62, 11, 92. . . . .]

c. Create a method called "*remove()"*, which deletes the last number input in the array.

d. You should overload the method created in the exercise **b** called "*remove(int index)*", "index" is the location which number will be deleted. Note that the "index" should be in between indexes already value in the array.

e. Overload the method exercise **a** called
"*insert(int array, int number, int index)"*, here "index" is the location where the number should be inserted. (Apply all validations)

f. Create a method called "*size"* to get the size of the LIST (public static int size(int array).

g. Create a method called "*isEmpty()"* to check the LIST is empty.
(public static Boolean isEmpty(int[] aarray))

h. Create a method called "*isFull()",* to check the LIST is empty. (public static boolean isFull(int[] array)

i. Create a method called "*clear() ",* to clear the LIST.
(public static void clear(int[] array) all elements should be zero.

j. Create a method called "*removeDuplicates()*" to remove all duplicates numbers of the LIST.

k. Create a method called "*searchElement()*" to find the location of a given number.
public static int search(int[] array, int number)

l. Create a method called search() to check whether a given number exists if the LIST.
public static boolean isExist(int[] array, int number)