

FINAL
Examination Paper

(COVER PAGE)

Session : August 2016

Programme : Diploma In Information And Communication Technology (DICTN

Course : **ICT2100: Object Oriented Programming**

Date of Examination : 08 December, 2016 (Thursday)

Time : 2:00pm – 4:00pm Reading Time : Nil

Duration : 2 Hours

Special Instructions :

Answer any **FOUR (4)** questions in the answer booklet provided.

Materials permitted : Non-programmable Calculator

Materials provided : Nil

Examiner(s) : **Ng Ruoh Ling** and Shahrیمان Mohd Said

Moderator : Siti Hawa Mohamed Said

This paper consists of 7 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY
PROGRAMME (DICTN)
ICT2100: OBJECT-ORIENTED PROGRAMMING
FINAL EXAMINATION: AUGUST 2016 SESSION

Instruction: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) List the method of a class used to convert between each of the following data types:

- (i) String to int
- (ii) String to float
- (iii) double to String
- (iv) String to char

(4 marks)

(b) Provide the output of the following program:

```
public class q1b {
    public static void main(String []arg)
    {   int j = 1;
        for (int i = 1; i <= 5; i++) {
            switch (i) {
                case 1: j++;
                case 2: j++;
                case 3: j++;
                case 4: j++;
                case 5: j++;
                default: j++;
            }
            System.out.println(i + "," + j + "," + (i - j));
            j=1;
        }
        test(3,10);
    }
    public static void test(int x, int y)
    {   if (x <= y)
        test(x+1,y-1);
        System.out.println(x+", "+y);
    }
}
```

(10 marks)

(c) Write a method that takes a **word**, a **letter**, and an **index** through its parameters and display half of the **word**, the position of the **letter** in the **word**, and the letter in the **word** at position number **index**. For instance, if the word is "congratulations", the letter is 'g' and the index is 5. The output should be:
Half of the word "congratulations" is "congrat"
The letter 'g' is at position number 4
The letter at position number 5 is 'r'

(11 marks)

Question 2

(a) State if the following conversions are valid or invalid:

- (i) `char c = 'A';`
`int i = c;`
- (ii) `double balance=56.65;`
`float money=balance;`
- (iii) `int x=1;`
`boolean isStudent = x;`
- (iv) `int index = 65;`
`char letter = index;`
- (v) `int value=56;`
`String output=value;`

(5 marks)

(b) Write a method that takes a positive binary number (based 2) through its parameter and display how many 0s and 1s are in the number. For example, if the number passes to the method is 100111001, then the output should be "100111001 has 5 ones and 4 zeros".

(10 marks)

(c) Explain the following concepts in object-oriented programming:

- (i) Polymorphism
- (ii) Overriding method
- (iii) Abstract method
- (iv) Class/object composition
- (v) Final class

(10 marks)

Question 3

(a) Given that variable `int a = 2`, `double b=1.0` and `boolean f = true`, what is the result of each of the following expressions?

- (i) `b-= ++a - 2 * a++ /2 ;`
- (ii) `b-= 3.4 *(a+5) * b;`
- (iii) `f = ++b > ++a || b-- < --a;`

(6 marks)

- (b) Given the following array:

```
Scanner scan=new Scanner(System.in);
int []num = new int[10];
for(int i=0; i<10; i++)
{
    System.out.println("Enter a number:");
    num[i]=scan.nextInt();
}
//code here
```

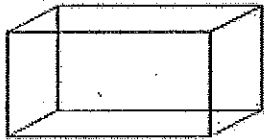
Continue to provide the program fragment that will print all the values in the array without repeating any number. For instance: if the input numbers are 1, 2, 3, 6, 3, 7, 2, 4, and 3, the output should be 1 2 3 6 7 4. Provide necessary variable declaration.

(9 marks)

- (c) Given the following interface:

```
public interface Shape {
    public static final double PI=3.142;
    public abstract double area();
    public abstract double basePerimeter();
    public abstract double volume();
}
```

Write a class for object Rectangular prism (3D rectangular as shown in the diagram below) that implements interface Shape with appropriate attributes and methods.



(10 marks)

Question 4

- (a) Arrange the precedence of the following 5 groups of operators from higher order to lower order:

- Assignment operator
- Logical operator
- Relational operator
- Arithmetic operator
- Increment operator

(5 marks)

- (b) Given the following object declaration:

```
HousingLoan aLoan = new HousingLoan (300000.00, 30, 4.2f);
```

where 300000 is the loan amount, 30 is the loan term in year, and 4.2f is the interest rate.

Write the class HousingLoan with proper attributes, constructor and toString method.

(10 marks)

- (c) (i) Explain overloading constructor and provide a benefit of overloading constructor.
- (ii) Write the overloading constructors for class HousingLoan to allow the following object declarations:

```
HousingLoan loan2=new HousingLoan(20000);
HousingLoan loan3= new Housing (3.8f);
```

(6 marks)

Question 5

- (a) List any **FIVE** methods found in class Math and the arguments needed for each method.
- (b) Write an output statement using println and either Math.random or class Random's nextInt method to generate and print a random integer between each of the following range:
- (i) 0 to 100
(ii) 50 to 99
(iii) -20 to 10
- (c) A website is selling two main goods: clothes and bags. The information for clothes include product name, price, color, sizes (S,M,L,XL), and material. The information for bags include product name, brand, price, color, and material.
- Design and write the superclass and child classes with only appropriate attributes that are able to store the information for both goods. Note: no behaviors are required in your classes.
- (d) Differentiate between static attribute and non-static attribute. Using one object class, give **ONE** suitable example for each static and non-static attribute.

(5 marks)

(6 marks)

(8 marks)

(6 marks)

Question 6

- (a) Assuming all packages are imported, identify **TWO** syntax/runtime errors in each of the following program fragments:

(i)

```
float tax;
int salary;
salary =Integer.parseInt(
JOptionPane.showInputDialog("Enter your salary"));
if (salary <=25000)
tax = 10.0;
else if (salary > 25000)
tax = 15.0;
System.out.println("Your tax is " + tax);
```

(ii)

```
int i=1;
while (i<=5)
{   if(i==3)continue;
    System.out.println(i);
    i++;
}
for(int j=1; j<=5; j++)
{   if(j==3)continue;
    System.out.println(i);
}
System.out.println(j);
```

(8 marks)

- (b) Given the following code:

```
System.out.println("Enter a message: ");
String input=scan.nextLine();
System.out.println("Enter a number: ");
int index=scan.nextInt();
char letter = input.charAt(index);
```

- (i) What are the **TWO** possible exceptions that may occur?

(2 marks)

- (ii) Rewrite the code with exception statements that can detect, handle the errors and print the error message out.

(5 marks)

(c) Trace the output of the following program:

```
public class Parent {
    protected int x;
    protected static int y=10;
    public Parent(int x)
    {
        this.x=x;
        System.out.println("x="+x+", y="+y);
    }
}

class ChildA extends Parent{
    int a;
    ChildA(int a)
    {
        super(5);
        this.a=a;
        ChildB cb=new ChildB(5);
        y+=10;System.out.println("x="+x+", y="+y);
        System.out.println("a="+a);
        System.out.println("b="+cb.b);
    }
}

class ChildB extends Parent{
    int b;
    ChildB(int b)
    {
        super(3);
        this.b=b;
        y+=5;
        System.out.println("x="+x+", y="+y);
        System.out.println("b="+b);
    }
}

class Client{
    public static void main(String arg[])
    {
        ChildB cb=new ChildB(7);
        ChildA ca=new ChildA(8);
    }
}
```

(10 marks)

~ The End ~

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