



INTI
International College Penang

FINAL
Examination Paper
(COVER PAGE)

Session : April 2018

Programme : Diploma in Electrical and Electronic Engineering (DEEI)

Course : CSC2181: Object Oriented Programming in Java

Date of Examination : 31 July 2018 (Tuesday)

Time : 11:00am – 1:00pm

Duration : 2 hours Reading Time : Nil

Special Instructions :

This paper consists of SIX (6) questions. Answer any FOUR (4) questions in the answer booklet.

IMPORTANT NOTE : THIS PAPER SHOULD NOT BE TAKEN OUT OF THE EXAMINATION HALL

Materials Permitted : Non-Programmable Scientific Calculator

Materials Provided : Nil

Examiner(s) : Mr. Lai Kim Min

Moderator : Dr. Vincent Khoo

This paper consists of 6 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING (DEEI)
CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA
FINAL EXAMINATIONS: APRIL 2018 SESSION

Instructions: 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) Differentiate between pass-by-value and pass-by-reference. (4 marks)

(b) Rewrite the following five assignment statements into a single statement using prefix and postfix increment and decrement operators as necessary. Assume all variables are `int` variables.

```
x = y + 1;  
y = y + 1;  
z = z - 1;  
x = x - z;  
x = x + 1;
```

(3 marks)

(c) Create an interface called `Visible` that includes two methods: `makeVisible` and `makeInvisible`. Both methods should take no parameters and should return a boolean result. Describe how a class might implement this interface.

(5 marks)

(d) Write a Java program that prompts for and reads a double value from the user using an input dialog. Then display the result of raising that value to the fourth power with a message dialog box. Output the results to 3 decimal places.

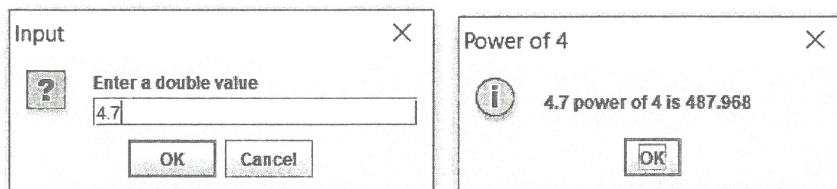


Figure 1.0: Sample Screen

(13 marks)

Question 2

(a) What is a wrapper class? Why are wrapper classes useful?

(4 marks)

(b) Trace the output for the following code fragment:

```
int y;
int x = 1;
int total = 0;

while (x < 4) {
    y = x * x;
    System.out.println(y);
    total = total + y;
    ++x;
}
System.out.printf("Total is %d", total);
```

(4 marks)

(c) Identify the exception classes that will be thrown for the following cases:

- i) Attempt to convert a string into a number but the string does not have the proper format
- ii) Attempt to divide a number by zero
- iii) Attempt to call an instance method of a null reference

(6 marks)

(d) Write a Java program that reads and prints integer values entered by a user until a particular sentinel value (stored in SENTINEL) is entered. Do not print the sentinel value.

Sample output

```
Enter some integers (-1 to quit): 1
Enter some integers (-1 to quit): 5
Enter some integers (-1 to quit): 9
Enter some integers (-1 to quit): -1
```

(11 marks)

Question 3

- (a) Write a for statement to compute the sum $1 + 2^2 + 3^2 + 4^2 + 5^2 + \dots + n^2$. (3 marks)
- (b) What is the difference between a mutator method and an accessor method? Provide an example of each. (6 marks)
- (c) Write a code fragment to populate a set of random numbers the range of 1 to 100 (inclusive) to a 2-dimensional array called `board` as integer type with 100x100 dimension. (8 marks)
- (d) Write a static method called `isIsocoles` that accepts three integer parameters that represent the lengths of the sides of a triangle. The method returns true if the triangle is isosceles but not equilateral (meaning that exactly two of the sides have an equal length), and false otherwise. (8 marks)

Question 4

- (a) Write a code fragment that outputs all of the `int` values between 1 and 100 with five values per line, and each of those five values spaced out equally. Use a single `for` loop to solve this problem. (4 marks)
- (b) What is an abstract class? Give an example and explain how it works. (4 marks)
- (c) Based on the given class definition:

```
class Activity {
    private String title;
    private String aDate;

    @Override
    public String toString() {
        return String.format("Title:%s\nDate:%s\n", title, aDate);
    }
}
```

- i) Create a default and an overloaded constructors for `Activity` class. (4 marks)
- ii) Derive a class `OutdoorActivity` from `Activity` class. `OutdoorActivity` class will have two instance attributes called `longitude` and `latitude` as double type. Define a constructor for `OutdoorActivity` class. (7 marks)
- iii) Implement an instance method called `printDetails` in `OutdoorActivity` class. This method will print out all the activity's details. (6 marks)

Question 5

- (a) Based on the following scenario, write a fragment of code with multi-branch if-else statement to compute the service charge.

If the check amount is less than \$10, we will charge \$1.

If the amount is greater than \$10 but less than \$100, we will charge 10% of the amount.

If the amount is greater than \$100, but less than \$1,000, we will charge \$5 plus 5% of the amount.

If the value is over \$1,000, we will charge \$40 plus 1% of the amount.

(5 marks)

- (b) Based on the given classes:

```
public class Date
{
    private int month; // 1-12
    private int day;   // 1-31 based on month
    private int year;  // any year

    //Assume getters and setters methods are here

    public String toString() {
        return String.format("%d/%d/%d", month, day, year);
    }
}

public class Software
{
    private String name; // Software name
    private Date release; // Release
    private double cost; // Pricing

    public Software(String n, Date, r, double c) {
        name = n;
        release = r;
        cost = c;
    }
}
```

- i) Implement a constructor for Date class. It should accept 3 parameters to initialize all the instance variables. Throw `IllegalArgumentException` if the month (1-12) and day (1-31) are out of range. (7 marks)
- ii) Create appropriate getters and setters methods for Software class. (6 marks)
- iii) Write a code fragment to create a Software object and add it into a list as `ArrayList` type. Provide appropriate exception handling block to handle any invalid inputs of Date object. (7 marks)

Question 6

- (a) Explain what happens if an exception is not caught in Java runtime environment. (4 marks)
- (b) Write a Java program that prompts a lecturer to enter grade [A/B/C/D/F] for five different subjects each for ten students and store all the grades into an array. Verify the grade for each of the entries.

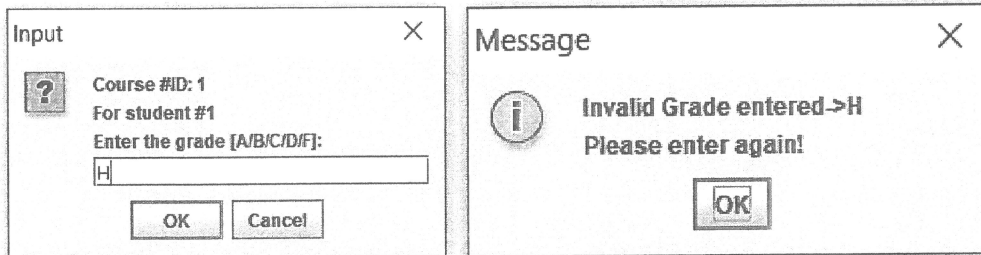


Figure 2.0: Invalid Input

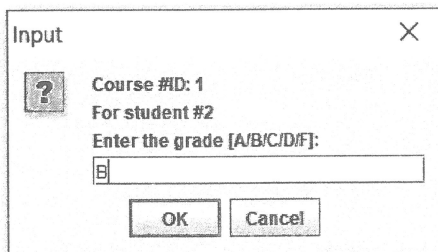


Figure 3.0: Valid input

(21 marks)