Beijing-Dublin International College

School of Computer Science

COMP2011J Object Oriented Programming

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Time Allowed: 60 minutes

Instructions for Candidates:

Answer **All** questions.

BJUT Student ID:＿＿＿＿＿＿＿＿   **UCD Student ID:**＿＿＿＿＿＿＿＿

I have read and clearly understand the Examination Rules of both Beijing University of Technology and University College Dublin. I am aware of the Punishment for Violating the Rules of Beijing University of Technology and/or University College Dublin. I hereby promise to abide by the relevant rules and regulations by not giving or receiving any help during the exam. If caught violating the rules, I accept the punishment thereof.

Honesty Pledge:＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿ **(Signature)**

Instructions for Invigilators

Non-programmable calculators are permitted.

No rough-work paper is to be provided for candidates.

Question 1:

a. Given the variables listed below, calculate the **type** of data that would be returned as the result of each of the following expressions? Explain each of your answers.

- An boolean value (`b`)
- A long value (`l`)
- A float value (`f`)
- An int value (`i`)
- A String value (`t`)
- A double value (`d`)

(i) `i / l`   (iii) `f + d`   (v) `b && b`

(ii) `t + (i * i)`   (iv) `i * i`

(10%)

b. What is the function of the keyword `final` in Java? What effect does it have on a variable? What effect does it have on a method? What effect does it have on a class?

(10%)

c. What is the implicit parameter? Given the following example of comparing two date objects (`birthday` and `today`), which is the implicit parameter?

```
1  today.sameDate(birthday);
```

Rewrite the following method to show the implicit parameter in the code using the keyword `this`:

```
1  public void summate(int a){
2    count = count + a;
3    if (count > 28){
4      return sum();
5    }
6  }
```

(10%)

d. Java has many rules about what names we can use for classes, methods and variables (known as identifiers). In addition to this programmers should also follow a number of conventions for identifiers. For each of the following, list the conventions (**not the rules**) that you should follow:

(i) All identifiers   (iii) Variable identifiers

(ii) Class identifiers   (iv) Constant identifiers   **(10%)**

e. Assume that you need to read some information from the command line. The information is two numbers followed by a single string (with no spaces) e.g. `"7 12 Sean"`. Write the code to create a scanner and use it to read this information. If the information is entered correctly, the numbers should be added together and printed to the screen followed by the string. If any information is not in the correct format then the message `"Error reading data"` should be printed to the screen. **(10%)**

f. Describe the difference between traditional testing and unit testing. How do we know when we have enough code coverage in our testing?

(10%)

g. When does Java know what type a generic object will be using? Give an example of the code required to construct an object based on the generic class named GC. The object should use integer values for the parametrised type. The class has a constructor that takes no parameters.

(10%)

h. Explain in your own words the OOP concept **cohesion**. Describe *high* and *low* cohesion. Which is considered good? Why?   **(10%)**

i. What is the difference between the information in a text file and a data file? Give an example of both storing the integer value 123. What would happen if I try to use `readLine` from a `BufferedReader` to read information from a data file containing integer values?

(10%)

j. What is encapsulation? Why is it useful in Object-Oriented Programming? How do we implement encapsulation in Java?   **(10%)**

(Question Total 100%)

Total Marks (100%)