

THE UNIVERSITY OF AUCKLAND

SUMMER SEMESTER, 2010
Campus: City

COMPUTER SCIENCE
TEST
Principles of Programming

(Time Allowed: 75 minutes)

NOTE:

You must answer **all** questions in this test.

No calculators are permitted

Answer in the space provided in this booklet.

There is space at the back for answers that overflow the allotted space.

Surname	
Forenames	
Student ID	
Login (UPI)	
Lab Time	

Q1 (/10)	Q4 (/10)	Q7 (/18)
Q2 (/10)	Q5 (/12)	Q8 (/15)
Q3 (/15)	Q6 (/10)	Total /100

ID:

Question 1 (10 marks)

- a) What is the output produced by the following code?

```
System.out.println(3 + 5 + " + " + 2 + " * " + 8 + (2 + 1));
```

(2 marks)

- b) What is the output produced by the following code?

```
System.out.println("A\nB\n\nZ");
```

(2 marks)

- c) Complete the output produced by the following code.

```
int num = Math.min(Math.max(Math.min(3, 6), 5), 4);  
System.out.println("num: " + num);
```

num:

(2 marks)

ID:

d) Complete the output produced by the following code:

```
int a = 3;
int b = 4;
int c = a + b;
b = c - b;
a = a + a;
```

```
System.out.println("a: " + a + " b: " + b + " c: " + c);
```

a:	b:	c:
----	----	----

(2 marks)

e) Complete the output produced by the following code:

```
int a = 8 / 3;
int b = 8 % 3;
double c = 8 / 3;
```

```
System.out.println("a: " + a + " b: " + b + " c: " + c);
```

a:	b:	c:
----	----	----

(2 marks)

ID:

Question 2 (10 marks)

- a) The `int` variable, `number`, has the value 9. Complete the output produced by the following code:

```
boolean result;  
result = (number == 3 || number <= 0) && number != 4;  
System.out.println("result: " + result);
```

result:

(2 marks)

- b) The `int` variable, `number`, has the value 9. Complete the output produced by the following code:

```
boolean result = !(number < 0) && number >= 3;  
System.out.println("result: " + result);
```

result:

(2 marks)

- c) Write a boolean expression which tests whether the `int` variable, `number`, contains a value between 5 and 10 (inclusive).

(2 marks)

CONTINUED

ID:

d) What is the output produced by the following code?

```
int value1 = 8;
int value2 = 6;

System.out.print("A ");
if (value1 < value2) {
    System.out.print("B ");
    value1 = 10;
} else if (value2 < 10) {
    System.out.print("C ");
    if(value1 < 20) {
        System.out.print("D ");
    }
    value2 = value2 / 2;
}
System.out.println(value1 + " " + value2);
```

(2 marks)

e) What is the output produced by the following code?

```
int value1 = 5;
int value2 = 6;

System.out.print("A ");
if (value1 < value2) {
    System.out.print("B ");
    value1 = 10;
}
if (value2 < 10) {
    System.out.print("C ");
    if(value1 < 20) {
        System.out.print("D ");
    }
    value2 = value2 / 2;
}
System.out.println(value1 + " " + value2);
```

(2 marks)

ID:

Question 3 (15 marks)

- a) Complete the output produced by the following code. The user input is outlined and in bold.

```
String prompt = "Enter a single digit positive number: ";
System.out.print(prompt);
int num = Integer.parseInt(Keyboard.readInput());
int tries = 1;
while (num > 9) {
    System.out.print(prompt);
    num = Integer.parseInt(Keyboard.readInput());
    tries++;
}
System.out.println("Tries: " + tries + " Num: " + num);
```

Enter a single digit positive number: **21**

Enter a single digit positive number: **345**

Enter a single digit positive number: **10**

Enter a single digit positive number: **7**

Tries: Num:

(3 marks)

- b) What is the output produced by the following code?

```
for(int i = 0; i < 12; i = i + 3) {
    System.out.print(i + " ");
}
```

(3 marks)

CONTINUED

ID:

c) What is the output produced by the following code?

```
for(int i = 9; i > 5; i--) {  
    System.out.print(i + " ");  
}
```

(3 marks)

d) Consider the following array:

```
int[] goals = {3, 2, 3, 0, 4, 2, 5, 3, 1};
```

Complete the output produced by the following code.

```
goals[1] = goals[6];  
goals[0] = goals[goals.length - 1];
```

```
System.out.println("goals[0]: " + goals[0]);  
System.out.println("goals[1]: " + goals[1]);
```

```
goals[0]:  
  
goals[1]:
```

(3 marks)

ID:

e) Consider the following array:

```
int[] goals = {3, 2, 3, 0, 4, 2, 5, 3, 1};
```

Complete the output produced by the following code.

```
int howMany = 0;
for(int i=0; i < goals.length; i++) {
    if (goals[i] > 3) {
        howMany++;
    }
}
System.out.println("Number: " + howMany);
```

Number:

(3 marks)

ID:

Question 4 (10 marks)

- a) Complete the output produced by the following code.

```
String phrase = new String("Fancy free");  
  
char c1 = phrase.charAt(1);  
char c2 = phrase.charAt(8);  
  
System.out.println("c1: " + c1 + ", c2: " + c2);
```

<pre>c1: c2:</pre>

(2 marks)

- b) Complete the output produced by the following code.

```
String word = new String("scrumptious");  
  
String part1 = word.substring(1, 4);  
String part2 = word.substring(9);  
  
System.out.println("part1: " + part1);  
System.out.println("part2: " + part2);
```

<pre>part1: part2:</pre>

(2 marks)

ID:

- c) Complete the output produced by the following code.

```
phrase = new String("Beyond the words");

int position1 = phrase.indexOf("d");
int position2 = phrase.indexOf("woo");

System.out.println("position1: " + position1);
System.out.println("position2: " + position2);
```

```
position1:
position2:
```

(2 marks)

- d) Complete the assignment statement in the code below so that the output is 'line 1'.

```
String language1 = new String("Italian");
```

```
String language2 =
```

```
if (language1 == language2) {
    System.out.println("line 1");
} else if (language1.equals(language2)) {
    System.out.println("line 2");
}
```

(2 marks)

- e) Complete the assignment statement in the code below so that the output is 'line 2'.

```
String country1 = new String("India");
```

```
String country2 =
```

```
if (country1 == country2) {
    System.out.println("line 1");
} else if (country1.equals(country2)) {
    System.out.println("line 2");
}
```

(2 marks)

CONTINUED

ID:

Question 5 (12 marks)

Complete the method header for each of the following methods (i.e. complete the first line of each method definition).

a) The method, `methodA()`, is called in the following way:

```
double result1 = methodA("23.5");
```

```
private _____ methodA ( _____  
                               _____ ) {  
  
    double n = Double.parseDouble(word);  
    n++;  
    return n;  
  
}
```

(3 marks)

b) The method, `methodB()`, is called in the following way:

```
String result2 = methodB("cat", 10);
```

```
private _____ methodB ( _____  
                               _____ ) {  
  
    num++;  
    return num + " " + word;  
  
}
```

(3 marks)

ID:

c) The method, `methodC()`, is called in the following way:

```
methodC(3, 33, "5, 9, 12");
```

```
private _____ methodC ( _____  
                               _____ ) {  
  
    String list2 = num1 + ", " + list1 + ", " + num2;  
    System.out.println(list2);  
}
```

(3 marks)

d) The method, `methodD()`, is called in the following way:

```
boolean result4 = methodD(true);
```

```
private _____ methodD ( _____  
                               _____ ) {  
  
    int ceiling = 20;  
    int n = (int)(Math.random() * ceiling);  
    if (n % 2 == 0 && wantsEven) {  
        return true;  
    }  
  
    return false;  
}
```

(3 marks)

ID:

Question 6 (10 marks)

Give the output when the following program is executed.

```
public class MyProgram {
    public void start() {
        System.out.print("1 ");
        methodOne();
        System.out.print("2 ");
        methodTwo();
        System.out.print("3 ");
        methodThree();
        System.out.println("4 ");
    }
    private void methodOne() {
        System.out.print("5 ");
    }
    private void methodTwo() {
        System.out.print("6 ");
        methodThree();
    }
    private void methodThree() {
        System.out.print("7 ");
    }
}
```

//Show output here

(10 marks)

ID:

Question 8 (15 marks)

- a) Complete the method, `printIfTrue()`, which is passed an `int` array and a `boolean` array as parameters. Both the parameter arrays have the same number of elements. The method prints the values of the `int` array only if the corresponding `boolean` element has the value `true`. The method does not print the `int` array value if the corresponding `boolean` element is `false`. For example, executing the following code with the completed method:

```
int[] nums = {9, 4, 7, 3, 2, 1};
boolean[] valid = {true, false, true, true, false, true };

printIfTrue(nums, valid);
```

gives the output:

9 7 3 1

```
private void printIfTrue(int[] a1, boolean[] a2) {

}
}
```

(7 marks)

CONTINUED

ID:

- b) Complete the method, `getMaxArray()`, which is passed two `int` arrays as parameters. Both the parameter arrays have the same number of elements. The method creates a new array of the same size as the parameter arrays and fills each element of the new array with the maximum of the two corresponding elements of the parameter arrays. For example, executing the following code with the completed method:

```
int[] nums1 = {13, 18, 49, 9, 51, 25, 23, 4 };
int[] nums2 = {33, 23, 41, 9, 17, 51, 13, 45 };

int[] maxA = getMaxArray(nums1, nums2);

printArray(maxA);
```

gives the output:

```
maxA: { 33, 23, 49, 9, 51, 51, 23, 45 }
```

Note: the `printArray()` method is not shown here

```
private int[] getMaxArray(int[] a1, int[] a2) {
    int[] maxA;

}
}
```

(8 marks)

CONTINUED

ID:

OVERFLOW PAGE

(If you have used this page, please indicate clearly under the relevant question that you have overflowed to this page)

SURNAME: FORENAMES:

ROUGH WORKING (WILL NOT BE MARKED)

(You may detach this page from the answer booklet and use it for rough working)

SURNAME: FORENAMES:

ROUGH WORKING (WILL NOT BE MARKED)

(You may detach this page from the answer booklet and use it for rough working)

