UNIVERSITY OF WESTERN ONTARIO

Computer Science 1026b, Spring 2010
Computer Science Fundamentals I
MIDTERM TEST
9:30am - 11:20am, Thursday, March 4, 2010.

Name (last, first): _____

Student Number: _____

Instructions

1. TURN OFF YOUR CELL PHONE.

2. Do not turn this page until instructed to do so.

3. Cheating (e.g. copying someone else's solutions, using prohibited material like your textbook and notes, or using electrical communication devices) will result in a zero grade and possible expulsion from the course.

4. We reserve the right to orally examine you regarding your solutions and then regrade accordingly.

5. Provide your solution in the box if a box is provided. All writing outside boxes will be ignored and as this is the case feel free to use the back of pages for rough work.

6. Only those exams written in pen are eligible for regrading.

7. Correct java code is preferable but pseudo-code (i.e. something resembling code) is acceptable and if appropriate will be accepted for partial marks.

1	10	
2	20	
3	10	
4	10	
Total	50	

Single Answer

Each answer in this section is worth *1 point* for a total of *10 points*.

Question 1

The following questions contain valid Java code and will provide output (without error) if entered into the DrJava interactions pane.

a. Suppose we have defined

```
int n = 4;
double x = 2.5;
```

then the value of the expression `5 * x - n / 5` is:

b. Suppose we have defined

```
int num1 = 50, num2 = 50;
```

then the value of the expression `(num1 == num2)` is:

c. After the following code segment is executed

```
int x = 3;
x = x + x;
x = x + x;
```

the value of `x` is:

d. After the following code segment is executed

```
int x = 3, y = 5;
x = y;
y = x;
```

the value `y` is:

e. If we declare the array

```
int [] intArr = {2,4,6,8,10};
```

then the value stored in `intArr[1]` is:

f. After the following code segment is executed

```
int sum = 0;
int count = 1;
while (count < 5) {
    sum = sum + count;
    count = count + 2;
}
```

the value of `count` is:

g. After the following code segment is executed

```
bool x = (true && false) || (true && true) || false
```

the value of `x` is:

h. After the following code segment is executed

```
int x = (3+3*2) % 6
```

the value of `x` is:

i. After the following code segment is executed

```
int [] xs = { 1, 2, 3, 4, 5, 6, 7 };
System.out.println(xs[xs.length]);
```

what is printed? (Your solution doesn't have to be exact).

j. After the following code segment is executed

```
int x = (int) 2.3 > 2;
```

the value of `x` is:

Short Answer

Each solution in this section is worth *4 points* for a total of *20 points*.

Question 2

a. What will be the output of the following code segment?

```java
for (int row = 1; row <=3; row ++) {
    for (int count = 1; count <= (4 - row); count++) {
        System.out.print("*");
    }
    System.out.println();
}
```


b. What happens when the following code segment is executed? Why?

```java
int sum = 0;
int count = 5;
while (count > 1) {
    sum = sum + count;
    count = count + 2;
}
System.out.println(sum);
```


c. In the space provided write a `for` loop that is equivalent to the following `while` loop.

```
int sum = 0;
int i = 3;
while (i < 100) {
    sum = sum + i;
    i = i + 3;
}
```

d. Suppose `Yertle` and `Franklin` are two Turtle objects in the same World. Provide a code segment that makes the two turtles face each other.

e. Write a code segment that creates a 400px by 300px (width by height) Picture object with all pixels set to red. Assume that this code will be part of the main program and *not* in the Picture class.

Long Answer

Each solution in this section is worth *10 points* for a total of *20 points*.

Question 3

a. Write an algorithm in pseudo-code (i.e. code mixed with english) which prints the following pattern when given **n**. Your method should work for any value of n and not only on the examples given below.

$n = 2$	$n = 3$	$n = 4$
xx	xxx	xxxx
xo	xxo	xxxo
oo	xoo	xxoo
	ooo	xooo
		oooo

b. Write a java class method `static void PrintPattern (int n)` that prints the same pattern as in Part a.

Question 4

Write a java object method `void nSidedPolygoon (int n, int s)` for inclusion in the Turtle class that takes as input n and s and draws an n-sided polygon with side length s. You may assume your turtle never goes out of bounds. The "exterior angle" will be $360°/n$ as illustrated for $n = 3$ and $n = 6$ in the figure below.

s

$\frac{360°}{3} = 120°$

s

$\frac{360°}{6} = 60°$
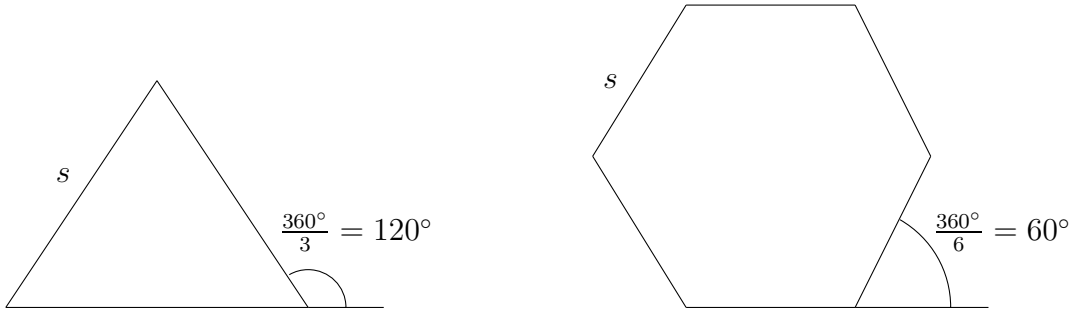
Rough Work

Nothing on this page will be marked. If this page is removed your exam will not be graded.