

Name: _____

Introduction to Computer Science I
Spring 2018
MIDTERM

This is a 50-minute, closed-notes exam. **Please put away all notes, phones, laptops, etc.** There are four problems, each of which is worth 25 points. Good luck!

Problem	Score
1	/25
2	/25
3	/25
4	/25

If you are unsure of what a problem is asking you do to, write down the question that you would like to ask me to help you clarify the problem, and write what you think my answer would be. If you have misinterpreted the problem, I will take this into account when grading.

You do not need to show any work beyond your final answer, but you are welcome to do so if you feel it will help me understand your thought process.

1. None of the following bits of code are correct: some have compiler errors, others have runtime errors, and others will run but do not produce the desired behavior. For each:

- Briefly (in a few words or a sentence) **explain what the mistake is**.
- Make a *small* correction to **fix the error**. Your corrections should *not* change the type of any variables.

(a) Desired behavior: program prints $5/10 = 0.5$. (Do not simply change the print statement to say `System.out.println("5/10 = 0.5")`.)

```
int x = 5;
int y = 10;
System.out.println(x + "/" + y + "=" + (x/y) );
```

(b) Desired behavior: program prints “big” if `i` is greater than 10, and “small” otherwise.

```
int i;
if(i > 10) {
    System.out.println("big");
}
else {
    System.out.println("small");
}
```

- (c) Desired behavior: at the end of the program, the variable `x` contains a number between 2 and 10 (inclusive). (Assume that some earlier part of the program contains the code needed to use the keyboard.)

```
System.out.println("Enter an integer between 2 and 10");
int x = keyboard.nextInt();
while( !(2 <= x <= 10) ) {
    System.out.println("Enter an integer between 2 and 10");
    x = keyboard.nextInt();
}
```

- (d) Desired behavior: at the end of the program, the variable `i` contains the value 11. (Do not simply set `i = 11`, and do not change the values stored in `p` and `q`.)

```
int p = 15;
double q = 4.5;
int i = p - q;
```

- (e) Desired behavior: program prints the sum of all integers from 1 to `x`. (Assume that some earlier part of the program contains the code needed to use the keyboard.)

```
int x = keyboard.nextInt();
for(int i = 0; i < x; i++) {
    int sum = sum + i;
}
System.out.println(sum);
```

2. Consider the following piece of code.

```
int i = 8;
int j = 5;

if( !(i % 3 == 2) || i + j < 10 ) {
    i = i - j;
    System.out.println("Message 1:" + (i + j) );
}
else if( i/j == 1 && j - i <= 0 ) {
    i = i + j;
    System.out.println("Message 2:" + (i + j) );
}
else {
    j = 3 * i;
    System.out.println("Message 3:" + (i + j) );
}
System.out.println("Last message:" + i + j);
```

What is the output of this program? That is, what prints when it runs?

3. Consider the following program:

```
int x = keyboard.nextInt();
boolean done = false;
int y = x - 1;
while(!done && y > 1) {
    if(x % y == 0) {
        done = true;
    }
    y--;
}
System.out.println("The answer is: " + done);
```

(a) What prints when the user enters the number 5?

(b) What prints when the user enters the number 4?

(c) In general, this program answers a question about the number the user typed in. What is that question? In other words, under what circumstances will the code print `The answer is true`, and under what circumstances will it print `The answer is false`?

4. The game Fizz-Buzz works as follows: you start counting up from 1, but every time you get to a multiple of 3 you say “fizz” instead of the number, and every time you get to a multiple of 5 you say “buzz” instead of the number. If the number is a multiple of both 3 and 5, like 15, you say “fizz buzz.”

Write a `for` loop to print out the numbers 1 through 100, Fizz-Buzz style. The output of your program should look something like:

```
1
2
fizz
4
buzz
fizz
7
8
```

And so on, continuing through 100 (which should print as “buzz”). For numbers that are multiples of both 3 and 5, “fizz buzz” should print out on a single line.