Midterm 1 Solution

CS 1324, Spring 2018

Name (printed legibly): _____

Student number: _____

Integrity Pledge

On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

Signed: _____

Do not write on the back of pages.

Answer all programming questions in Java. Unless otherwise indicated, each part of a problem is worth the same number of points. Show your work to receive partial credit.

Pay careful attention to whether the question asks for a code fragment or a complete program. Do not write a whole program when you are asked for only a few lines of code.

Also pay attention to whether you need to get input from a user or not. When you do not need to get input, the problem will say something like "you may assume that the variables' value was set somewhere else".

Pay careful attention to distinctions like int versus double and String versus char.

Try to move through short problems quickly to leave you sufficient time to write programs and code fragments.

You will have fifty minutes to take the examination.

You do not need to use import statements on any code. You may assume that the user enters all data perfectly unless otherwise noted.

You may abbreviate System.out.println as S.o.p., and may abbreviate prompts.

1) (10 points; 2 points each)

Write a declaration (type and identifier) to use to store each of the following things. Do not assume that each type is used exactly once.

a) The number of Olympic medals the U.S. Olympic team will win today

int medals;

b) The score for male figure skater Adam Rippon (figure skating scores are shown as numbers with two decimal digits, e.g. 330.43 is the highest score men have every scored).

double adamRipponScore;

c) The name of a jump a figure skater performs (typical names are toe loop, salchow, flip, lutz, and axel)

String jumpType;

d) The number of revolutions that a figure skater performs, coded as O (capital letter o) for one, T for two, R for three, and Q for four.

char revolutions;

e) Whether or not a given figure skater performs a tripe axel jump during their program.

boolean didTripleAxel;

2) (10 points; 2 points each) Give the value computed for each expression below. **Pay careful attention to type, especially char versus String and int versus double.** If the expression is not legal, say so. Characters and Strings must be properly distinguished by using single and double quotes.

a) 22 / 12

1

b) 18 % 12

6

c) 18.0 / 6

3.0

d) 3.9 + 1.1

5.0

e) “3.9” + “1.1”

“3.91.1”

3) (24 points; 6 points each part) Find the value assigned to result by each statement below. Show all intermediate steps to get partial credit. Each part is independent, with the values for any variables starting with the ones given below (do not use the results of a) in b), for example). **If the expression is not legal in Java, say so. Distinguish double and int values.**

```
int lutz = 35;
int axel = 4;
int salchow = 9;
double loop = 1.5;
double toeLoop = 30.9;
int flip = 10;
```

a) int result = lutz / salchow * axel;
= 35 / 9 * 4
= 3 * 4
= 12

b) double result = (int) toeLoop * loop;
= (int) 30.9 * 1.5
= 30 * 1.5
= 30.0 * 1.5
= 45.0

c) double result = lutz + salchow * axel;
= 35 + 9 * 4
= 35 + 36
= 71
= 71.0

d) int result = toeLoop * flip / axel;
Illegal since value on right is a double and cannot be stored in an int

4) (11 points; 4 points for a), 7 points for b)) ***Trace the code fragments*** below in the tables at the right. **Remember to include the initial values in the table.**

a)

```
int size = 9;
int result = size;
if (size < 5)
{
        result = size + 2;
}
else if (size <  12)
{
        result = size + 4;
}
else if (size < 19)
{
        result = size + 6;
}
if (size > 10)
{
        size = size - 5;
}
```

size	result
9	9
	13

b)

```
int number = 42;
int other = 35;
while (other != 0)
{
        int oldOther = other;
        other = number % other;
        number = oldOther;

}
```

number	other	oldOther
42	**35**	**35**
35	**7**	**7**
7	**0**	

5) (15 points; 10 points a), 5 points for b)) QTC (Quality, Talk, Convenience) is an online shopping network. They sell clothing, household goods, and shoes. One of their claims to fame is that they discount prices when you purchase multiple items of the same product. So for example, if you order the same shirt in three colors you get a discount on the second and third shirt. The table below describes the discount for a particular shirt. If the purchase value comes to more than $100, the customer receives free shipping.

Number	**Price**
1	29.99
2-10	25.88
11 or more	22.77

Shipping costs $5.99 per shirt when it is not free. For example: If you purchased 4 shirts it would cost $107.63 (29.99 + 25.88 + 25.88 + 25.88). The shipping would be free.

a) Write a code fragment that calculates how much QTC will charge for an order of shirts using the variables below. You must use the constants given.

```
int shirts; // the number of shirts purchased
double cost; // the cost of the order
final double ONE = 29.99;
final double TWO_TO_TEN = 25.88;
final double ELEVEN_PLUS = 22.77;


if (shirts==1)
{
        cost = ONE;
}
else if (shirts < 10)
{
        cost = ONE + (shirts-1)*TWO_TO_TEN;
}
else
{
        cost = ONE + 9 * TWO_TO_TEN + (shirts-10) * ELEVEN_PLUS;
}
```

b) Add the shipping cost using the variables in a). You may assume that the variable cost is properly set, even if you do not complete a).

```
if (cost < 100.0)
{
        cost = cost + shipping *5.99;
}
```

6) (30 points) Write a complete program that helps Mapable determine how satisfied their customers are with their recent contact with customer service.

The program will ask for the customer's name and email. It will then ask the customer how many times they had to contact Mapable to get the problem solved. If the customer contacted Mapable three times or more, the program should print out an apology. Then the customer should be asked if their problem is solved now. If the problem is solved, the program should print out a note of thanks. If the problem is not solved, the program should tell the customer that they will receive email with more help. Two runs of the program are shown below. Your program should run the exact same way.

You may abbreviate System.out.println as S.o.p. You also may abbreviate prompts, but make sure I can tell which prompt is which. For example, the first prompt could be shorted to "Name?".

First run:

```
Enter your name
Deborah Anne Trytten
Enter your email address
dtrytten@ou.edu
How many times did you contact Mapable to get your problem solved?
2
Is the problem you contacted us about now solved? Yes/No
Yes
Thank you for purchasing from Mapable
```

```
Second run:
Enter your name
Deborah Trytten
Enter your email address
dtrytten@ou.edu
How many times did you contact Mapable to get your problem solved?
3
We're sorry that your problem was so complicated
Is the problem you contacted us about now solved? Yes/No
No
We will email Deborah Trytten at dtrytten@ou.edu to give you more help
```

Please write program on the next full page and leave this page blank.

```java
import java.util.Scanner;

public class CustomerSatisfaction
{

	public static void main(String[] args)
	{
		Scanner input = new Scanner (System.in);

		System.out.println("Enter your name");
		String name = input.nextLine();
		System.out.println("Enter your email address");
		String email = input.nextLine();

		System.out.println("How many times did you contact Mapable to get your “
			+ “problem solved?");
		int contacts = input.nextInt();
		input.nextLine(); // remove newline character—not graded

		if (contacts >= 3)
		{
			System.out.println("We're sorry that your problem was so “
				+ “complicated");
		}

		System.out.println("Is the problem you contacted us about now solved?”
			+ “ Yes/No");
		String solved = input.nextLine();

		if (solved.equalsIgnoreCase("Yes"))
		{
			System.out.println("Thank you for purchasing from Mapable");
		}
		else
		{
			System.out.println("We will email " + name + " at " + email
				+ " to give you more help");
		}

		input.close(); // not graded
	}

}
```