Midterm 1

CS 1323, Spring 2017

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)

What type of data (int, double, String, char, or boolean) would you use to store each of the following things? Do not assume that each type is used exactly once.

a) Whether it rains today or not.

b) The number of inches of rain that we got in February, including partial inches.

c) A user's answer to the prompt: Did we get rain today? Yes/No

d) A user's answer to the prompt: Did we get rain today? Y/N

e) The number of millimeters of rain we got in February, rounded to the nearest millimeter (millimeters are metric units for length, like inches, but smaller).

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.

a) 3 / 5

b) 32 / 11

c) 32 % 11

d) 3.2 * 5

e) "3.2" + " 11"

3) (20 points; 4 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.**

Be sure to distinguish double and int values by **giving double values a decimal point**, even if it is a zero.

```
int duck = 5;
int goose = 14;
double pounds = 28.28;
```

a) `int result = -goose + duck * duck;`

b) `int result = goose /duck * duck % duck + 1;`

c) `double result = (double) goose / duck;`

d) `int result = pounds + goose + duck;`

e) `double result = (int) pounds / goose;`

4) (15 points; 3 points for a), 12 points for b)) SuperDuper is a rideshare company. Drivers are allocated rides from an app on a mobile phone. Drivers are paid $0.15 per minute of driving and $0.90 per mile and a $1.65 booking fee. Drivers have to pay 25% of their proceeds (including the booking fee) to SuperDuper. If the ride occurs during a busy time, called a swell, the driver is paid 1.5 times the regular rate. If the ride occurs during an extremely busy time, called a deluge, the driver is paid double the regular rate.

Write a code fragment that calculates how much a SuperDuper driver will be paid for a given ride.

Example: Suppose a driver drives 10 miles in 20 minutes. The customer would pay the driver (10 *0 .90) + (20 * 0.15) + 1.65 = $13.65. SuperDuper is paid ($13.65 * .25) + 1.65 = $5.06. The driver made $13.65 - 5.06 = $8.59. If this ride occurs during a swell, the driver makes $8.59 * 1.5 = $12.88. If the ride occurred during a deluge, the driver makes $8.59 * 2 = $17.18.

Use the variables below. The values of all of these variables were given elsewhere

```
int miles;
int minutes;
int loadFactor; // greater than 2 but less than 5 for a swell, and greater than or equal to 5 for a deluge
double driverPayment;
```

a) Create one constant you will use to solve this problem.

b) Write the code, using the constant from a).

5) (15 points; 5 points each part) ***Trace the code fragments*** below in the tables at the right. If there is an infinite loop, trace three trips through the loop and write "infinite loop" in the table. **Remember to include the initial values in the table.**

a)

```
int factor = 19;
int multiplier = 24;
if (factor < multiplier)
{
    factor = factor - 2;
}
else if (factor == 17)
{
    factor = factor – 2;
}
if (factor != multiplier)
{
    factor = factor * 2;
}
```

factor	multiplier

b)

```
int count = 7;
int sum = 0;
while (sum < count)
{
    sum = sum + count;
    count = count + 10;
}
```

sum	count

c)

```
int result = 1;
int count = 1;
while (result >= 0)
{
    count = count * count;
    result = result + count;
}
```

result	count

Do not write anything on the back of any page

6) (30 points) Write ***a complete program*** that analyzes weather data for an amateur weather enthusiast for a 7 day week. The user will enter the high and low temperature and the amount of rainfall each day. The program will write out the highest and lowest temperatures and the total rainfall for the month. This weather person sometimes forgets to measure and record their weather data. When this happens, the user will enter a -1 to indicate that the day's data is missing.

A sample run of the program is shown below:

```
For day: 1
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
80 70 0.0
For day: 2
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
82 68 1.2
For day: 3
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
-1
For day: 4
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
-1
For day: 5
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
90 50 0.5
For day: 6
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
-1
For day: 7
Enter the high temperature, low temperature, and rainfall, or -1 to skip today
70 30 0.0
The lowest temperature was 30
The highest temperature was 90
There was 1.7 inches of rainfall
```

You must use comments to explain your code.

You must use a loop.

Please start code on the next page

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