

Homework 1

Due: Sept. 5, 11:59 PM

Name:

Student ID:

Submission Instructions: This PDF contains fillable fields where you can input your answers. (For example, you can input your name and ID in the fields above.) Please save the document regularly so your answers are not lost. After you complete the assignment, upload a copy to Gradescope. A link to Gradescope can be found on the left side of the course Canvas page.

Important Note on Academic Integrity: This assignment should be completed individually. In recent semesters, improper collaboration on homework has led to multiple cases of plagiarism, where we receive identical or nearly identical submissions from two or more students. If you decide to discuss this assignment with other students before the deadline, make sure you first read the section of the syllabus on proper and improper collaboration. Additionally, you must include the names of these students below.

Names of Collaborators (if any):

Question 1 (10 points; 2 per part): Declare variables to store the information below in a Java program. For each part, declare a single variable with a well-chosen type and a meaningful, legal identifier. You do not need to assign any data to the variables.

Example: The number of singers in your favorite band:

```
int numSingers;
```

a) The name of your favorite band:

b) Whether your favorite band is touring this year:

c) The number of albums your favorite band sold last year:

d) The musical key of your favorite song:

(Your favorite band refuses to write songs in any key other than A, C, D, or G.)

e) The number of miles your favorite band traveled last night to reach Norman:

(Your favorite band's record company is a stickler for accurate travel reimbursement. They need to know the number of miles down to the nearest hundredth of a mile.)

Question 2 (14 points; 2 per part): Perform the arithmetic operations given below. Pay careful attention to the order of operations and whether the result is an int (like 3) or double (like 3.0). You can earn partial credit for an incorrect final result if you show correct individual operations and promotions. (Feel free to use Eclipse to check your work.)

Example: $1 * 2 + 3$
 $2 + 3$
5

a) $1 + 2 * 3$

b) $42 \% 5$

c) $42 / 5$

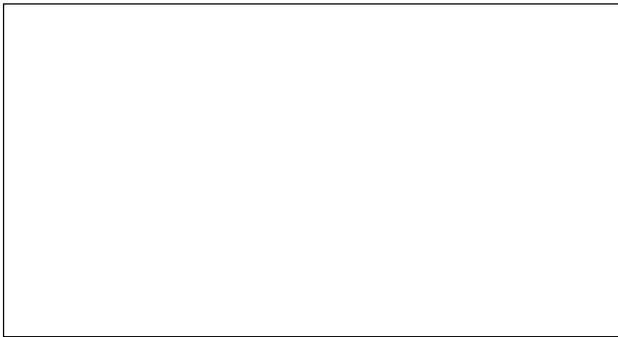
d) $(\text{int}) 41.9$

e) $42 / 5.0$

f) $2.0 / 5 + 5 / 2$



g) $0.0 - 3 \% 4 / 3 + 2$



Question 3 (6 points): The code below is intended to put three integers in sorted order; unfortunately, it contains an error. Trace the execution in the memory diagram to show what is going wrong. (You do not need to fix the code.)

```
int first = 8;
int second = 9;
int third = 7;

// Sort the values so first stores the smallest int, second
// stores the next-largest int, and third stores the largest.
third = second;
second = first;
first = third;
```

Memory diagram:

Identifier	Address	Contents
	100	
	101	
	102	
	103	
	104	

Note: To indicate that the contents of a variable have been overwritten, use a comma or some other delimiter to separate the old and new values (e.g., 3, 7).

Question 4 (20 points; 2 per part): Suppose that four variables are declared and initialized as follows:

```
int iSmall = 3;
int iLarge = 7;
double dSmall = 2.0;
double dLarge = 8.5;
```

For each line of code below, calculate the result stored in the variable number. If the code is not legal Java, explain why it will cause an error. If the result is a double with more than three digits after the decimal point, round to the third digit (e.g., round 7.7777 to 7.778). You can earn partial credit for an incorrect final result if you show your work.

Example: `double number = iSmall + iLarge;`

3 + 7

10

10.0 (Note that 10 is promoted to a double when it is assigned to number.)

Some of these computations are trickier than they may first appear. Consider writing a small program in Eclipse to check your work. I encourage you to solve them by hand first, however, since you won't have access to your laptop on the exams.

a) `double number = dSmall / iSmall;`

b) `int number = dSmall / iSmall;`

c) `int number = iSmall - (int) dLarge;`

d) `double number = iLarge % iSmall;`

e) `int number = (int) iLarge * dSmall;`

f) `int number = (int) (iLarge * dSmall) + iSmall;`

g) `int number = iLarge * iSmall % iLarge / iSmall;`

h) `int number = iLarge * iSmall % (int) dLarge / iSmall;`

i) `double number = (int) (dLarge * - dSmall + iLarge);`

j) `int number = iLarge + iSmall / dSmall - dLarge;`