CSE 131 Introduction to Computer Science **Spring 2016**

Exam I

Given: 15 February 2016 Due: End of session

This exam is closed-book, closed-notes, no electronic devices allowed. The exception is the "sage page" on which you may have notes to consult during the exam. Answer questions on the pages of the exam. Do not unstaple the pages of this exam, nor should you attach any other pages to the exam. You are welcome to use the blank space of the exam for any scratch work.

Your work must be legible. Work that is difficult to read will receive no credit. Do not dwell over punctuation or exact syntax in code; however, be sure to indent your code to show its structure.

You must sign the pledge below for your exam to count. Any cheating will cause the students involved to receive an F for this course. Other action may be taken. If you need to leave the room for any reason prior to turning in your exam, you must give your exam and any electronic devices with a proctor.

You must fill in your identifying information correctly. Failure to do so is grounds for a zero on this exam. When you reach this point in the instructions, please give the instructor or one of the proctors a meaningful glance.

Print clearly the following information:		
Name (print clearly):		
Student 6-digit ID (print *really* clearly):		
Your answers below tell us where to return your graded exam.		
What time do you actually attend studio/lab?		
What room (222, 218, 216, or 214)? your best guess		
Problem Number	Possible Points	Received Points
1	20	
2	35	
3	15	
4	30	
Total	100	

Pledge: On my honor, I have neither given nor received any unauthorized aid on this exam.

Signed: _____

(Be sure you filled in your information in the box above!)

1. (20 points)

   (a) (10 points) Circle the correct type for each expression in the table below, and state the result of evaluating the expression:

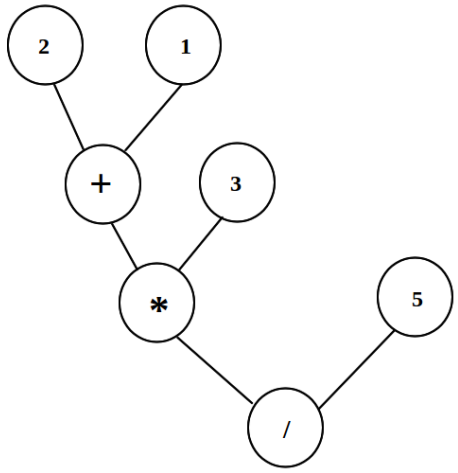
Expression	Type	Result
`5/2 >= 2.5`	double int boolean String	
`"He" + (6-5) + "p"`	double int boolean String	
`! (false || (3 > 2))`	double int boolean String	
`5.0 * 8`	double int boolean String	
`"2" + 3.0`	double int boolean String	
`25 < 46`	double int boolean String	
`3 / 2`	double int boolean String	
`(10*10) + "36"`	double int boolean String	
`(int) ( 1.2 * 10)`	double int boolean String	
`true && false`	double int boolean String	

   (b) (5 points) Below draw the expression tree[1] for the expression

$$1 + 2 * 3 + 4/5$$

[1] Or, explain exactly the order in which the operations occur.

(c) (5 points)



Complete the blanks below regarding the tree shown above, which uses the arithmethic operators +, ∗, and /:

- The _____ operator is the first operation to execute.
- The _____ operator is the last operation to execute.

2. (35 points)

(a) (10 points) Complete the code below so that it prints `true` if **(a > b > c)** or **(a < b < c)** Otherwise it should print `false`.

```
int a = ap.nextInt("Value for a?");
int b = ap.nextInt("Value for b?");
int c = ap.nextInt("Value for c?");
```

Continued on next page...

(b) (25 points) Complete the code below so that it determines the percentage of `N` random numbers that are greater than 0.75, with each random number chosen by a call to `Math.random()`. Recall that each call to `Math.random()` returns a `double r` such that $0 \leq r < 1$. Do not use any arrays! The printed percentage should have 1 decimal point precision (i.e. only print one number after the decimal point). Your code should produce output such as the following (in the example below, I typed `1000` in response to the prompt):

```
You asked for 1000 random numbers.
Of those, 27.5% were greater than 0.75.
```

Your output will depend on the value of `N` supplied when the program is run, as well as the results of the calls to `Math.random()`.

```
int N = ap.nextInt("How many random numbers?");
```

3. (15 points) We have studied 4 basic data types in the first part of our course: `int`, `double`, `boolean`, and `String`. Fill in the table below to supply the data type most appropriate for the specified scenario. Also give a brief explanation of why you made that choice. Note that a given scenario may have more than one correct answer.

Scenario	Circle one type 1 point	Explanation 2 points
Name of your best friend	double int boolean String	
Do you like dogs	double int boolean String	
Average yearly rainfall	double int boolean String	
Your grade for cse131	double int boolean String	
How much you like chocolate	double int boolean String	

4. (30 points) Yuko is planning a party. She does not like to cook so she has created a list of catering[2] companies and the price each charges per person for a party. The list is represented as two arrays. The first array, called `names`, lists the names of the catering companies. The second array, called `prices`, lists the price the company charges per person at the party.

   An example of such arrays follows:

`names` array	`[0]`	`[1]`	`[2]`	`[3]`	`[4]`
contents	HappyBBQ	FancyFood	EatRite	GoodEats	HungryHippo

`prices` array	`[0]`	`[1]`	`[2]`	`[3]`	`[4]`
contents	1.25	3.50	8.00	2.75	10.15

   In this particular example, we can tell the following from the above array:

   - `names[0]` = *HappyBBQ*, meaning that the first catering company is named HappyBBQ.
   - `prices[0]` = 1.25 tells us that HappyBBQ charges $1.25 per person.
   - If she wants to host a party for 8 people, it costs $10.

   The above is only an example of a `names` array and a `prices` array. Suppose you are given another pair of `names` and `prices` arrays for different set of catering companies.

   (a) (2 points) What data type is `names`?

   (b) (2 points) What data type is `prices`?

   (c) (5 points) Complete the code below so that it sets `C` to the size of the `names` array:

```
//How many catering companies are listed? put code below


int  C  =
```

[2] catering means providing food and drink at an event.

(d) (21 points) The number of people coming to the party is `N` and Yuko's budget is `B`. For each catering company, print out the name of the company, the cost of the party if catered by this company and how much above or below her budget the cost is. As an example, your output would resemble the following if you were given the `names` and `prices` arrays shown at the beginning of this question if `N=8` and `B=25`.

```
For a party of 8:
HappyBBQ will cost $10 which is $15 below budget
FancyFood will cost $28 which is $3 above budget
EatRite will cost $64 which is $39 above budget
GoodEats will cost $22 which is $3 below budget
HungryHippo will cost $81.20 which is $56.20 above budget
```

Complete the code below. For each catering company, have it print the name, cost and difference from budget for a party of size N.

```
ArgsProcessor ap = new ArgsProcessor(args);
int N = ap.readNextInt("How many people will be at the party?");
double B = ap.readNextDouble("What is your budget?");
//print out size of party (1 point)


for (                        ) {  //for each catering company (5 points)


     //find the cost for a party of size N  (5 points)




    //calculate the difference between the cost calculated
    //above and the budget B (5 points)




   //print out name of catering company, cost, and
   //budget difference. your format may vary from the example (5 points)




}
```