Homework 1 – Hunter Black

CS 1323, Fall 2015

This homework is due on Friday, September 11, by 11:59 p.m.. You must submit homework in a PDF file online to the dropbox on Janux. Please make sure that the formatting of the file is appropriate. Empty pages, pages with single words or excessive indentation or large spaces between lines are not permitted. Poorly formatted documents are unprofessional. If you're not great with Word, now is a good time to learn (and I do feel your pain).

If you are using Open Office or Star Office, check to be sure that the figures and diagrams in your PDF file are properly formatted, as this is a common problem with these products.

Name (5 points):

1. (5 points; 1 point each part) Declare a variable with a well chosen identifier for each of the data elements below:

    a) The name of the company that had the most recent computer security breech.

    string companyName; // Name of company with most recent security breech

    b) The number of computer accounts that were hacked this week.

    int hackedComputer; // Number of hacked computers this week

    c) Whether or not a given company had a security breech this week.

    boolean companyBreeched; // Whether or not a computer has been breeched

    d) The average number of times that a single consumer has a security breech on their accounts in a given year.

    double avgBreechYear; // Average number of times single consumer has security breech

    e) The answer to the question:

    "Was your account breeched this week? Enter Y or N"

    boolean accountBreeched; // Whether or not a computer had a breech

2. (12 points; 2 points each part) Perform the given operations on the data below. Pay careful attention to whether the result is a int (like 3) or a double (like 3.0). It is best to show individual operations and promotions to get partial credit.

    a. 6 * 3
  - Answer is 18

    b. 43 % 6
  - 7 remainder 1
  - Answer is 1

    c. 47 / 6
  - 7 remainder 5
  - Answer is 7

    d. 48 / 4.0
  - 48 promoted to double 48.0
  - 12.0 remainder 0.0
  - Answer is 12.0

    e. 3 * 6 / 8.0 – 2
  - 3 * 6 is 18
  - 18 is promoted to double 18.0
  - 18.0 / 8.0 is 2.0
  - 2 is promoted to double 2.0
  - 2.0 – 2.0 is 0.0
  - Answer is 0.0

    f. 3 * 6 / 8 - 2.0
  - 3 * 6 is 18
  - 18 / 8 is 2
  - 2 is promoted to double 2.0
  - 2.0 – 2.0 is 0.0
  - Answer is 0.0

3. (8 points) The code below is trying to create a right rotation of data (so (1, 2, 3) would become (3, 1, 2) for example), but is not correct. Draw a memory diagram to trace the execution of the code below to show what is going wrong. You do not need to fix the code.

```
int first = 6;
int second = 1;
int third = 2;

second = first;
third= second;
first = third;
```

Identifier	Address	Contents
first	100	6 to 6
second	101	1 to 6
third	102	2 to 6

	103	
	104	
	105	

4. (20 points; 2 points each) What does the variable number contain at the end of each of these computations? If the code is not legal, say so. If you encounter a decimal number with many places, you may show only 3 (even though this isn't really what the computer does). Show your work to receive partial credit.

You can check that you've done these correctly by writing a little computer program, but make sure that you do them by hand first to understand the critical ideas of precedence and promotion. There will be questions like this on the first midterm, and you won't have a computer available.

int iCount = 10;

double dCount = 2.9;

int iSize = 6;

double dSize = 4.2;

   a. int number = iCount + iSize;
      - 10 + 6
      - Answer is 16
   b. int number = (int) dCount + iCount;
      - 2.9 becomes int, 3
      - 3 + 10
      - Answer is 13
   c. double number = (int) (dSize - dCount);
      - 4.2 – 2.9 is 1.3
      - 1.3 becomes int, 1
      - Answer is 1
      - Code is not legal
   d. int number = (int) dCount + - dSize;
      - 2.9 becomes int, 3
      - 3 + -4.2
      - 3 is promoted to 3.0
      - 3.0 + -4.2
      - Answer is -1.2
      - Code is not legal
   e. int number = iSize% iCount;
      - 6 % 2.9
      - 6 is promoted to 6.0
      - 6.0 % 2.9
      - Answer is 0.2
      - Code is not legal
   f. double number = iCount / iSize;
      - 10 / 6
      - Answer is 1
      - Code is not legal
   g. int number = iSize * iSize * iSize / iCount % iSize;

- 6 * 6 * 6 / 10 % 6
- 6 * 6 is 36
- 36 * 6 is 216
- 216 / 10 is 21
- 21 % 6 is 3 remainder 3
- Answer is 3

h. double number = dSize + iCount - dCount + -dSize;

  - 4.2 + 10 – 2.9 + -4.2
  - 4.2 + 10 (10 is promoted to double 10.0) is 14.2
  - 14.2 – 2.9 is 11.3
  - 11.3 + -4.2 is 7.1
  - Answer is 7.1

i. double number = iSize - iCount + iSize / dCount;
  - 6 – 10 + 6 / 2.9
  - 6 / 2.9 (6 promoted to double 6.0) is 2.068
  - 6 – 10 is -4
  - -4 + 2.068 (-4 is promoted to double -4.0) is -1.932
  - Answer is -1.932

j. double number = ((iCount - iSize) + iCount) - (dCount * iSize)/dSize;

  - ((10 – 6) + 10) – (2.9 * 6) / 4.2
  - 10 – 6 is 4
  - 4 + 10 is 14
  - 2.9 * 6 (6 is promoted to double 6.0) is 17.4
  - 17.4 / 4.2 is 4.142
  - 14 – 4.142 (14 is promoted to double 14.0) is 9.858
  - Answer is 9.858