Name _______________________________________________

Midterm Exam

COMP 14-090 Summer I 2000

June 7, 2000


2. Write all answers on the test itself. Do not write any answers in a blue book or on scratch paper.

3. If you finish before 11:15, you may bring your test to the front of the room.

4. Keep your answers short and to the point. Longer is not necessarily better.

5. Budget your time carefully. Read over the entire exam before starting.

6. Write legibly. If I can’t read it, you can’t get credit for it.

7. Write your name on every page of this exam.

8. You do not need to put comments in any code you write. You will not be graded for coding style. But, if I can’t understand it you can’t get credit for it.

9. Make sure your answer clearly indicates the result (versus your scratch work). **Draw a box around your answers.**

10. Assume any code segment is embedded in a correct program.

11. Assume all variables have been appropriately declared before they are used. Their type will be obvious from the usage.

12. When showing program output, you do not have to indicate the exact spacing but do show when an output starts on a new line.

I pledge that I have neither received nor given unauthorized aid on this examination.

Signed: _________________________________________________________

Printed Name: ___________________________________________________
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__200 points__  Total Score ____________
Section I – Multiple Choice / Fill in the Blank [4 points each]

Circle the option that correctly fills in the blank.

1) ___________ errors can be detected at compile time.
   a) run-time   b) syntax   c) logical   d) random

2) A program that we’ve written in COMP 14 is an example of __________.
   a) software   b) hardware   c) operating system   d) compiler

3) The first step in solving a problem is _________________.
   a) designing a solution   b) implementing a solution
   c) writing Java code   d) understanding the problem

4) __________ is not a valid Java identifier (i.e. can not be used to name variables, methods, or classes).
   a) switch   b) almostDone   c) $earned   d) ready4Friday

5) __________ is a Boolean operator.
   a) ^   b) %   c) ||   d) =

6) __________ is an example of a narrowing conversion.
   a) int to float   b) float to double   c) int to long   d) double to int

Section II – True / False [4 points each]

In the blank, write T if the statement is true or F if the statement is false.

7) Formal parameters are defined in the method header.   ______

8) main is a method.   ______

9) The execution of a program starts at the first method after the class header.   ______

10) An object is an encapsulated entity.   ______
Section III – Short Answer

11) [10 points] Describe the relationship between a class and an object. You may use examples to aid in the description.

12) [10 points] Describe the relationship between an object and a method. You may use examples to aid in the description.

13) [10 points] Given the following declarations, what is the result of each of the expressions?

```java
int x = 4, y = -3, z = 2;
```

a) \(x + y / z\);

b) \(x * y + z\);

14) [10 points] When would you use a `for` loop instead of a `while` loop?
15) [30 points] Given the following loop:

```java
for (int i=0; i<10; i++) {
    if ((i % 2) == 0) {
        System.out.println (i);
    }
}
```

a) [5 points] Identify the loop control variable.

b) [5 points] Circle and label the 4 parts of the loop.

c) [5 points] What is the output produced by the loop?

d) [10 points] Convert this loop into a `while` loop.

e) [5 points] Circle and label the 4 parts of the loop you wrote in part d.
16) [10 points] What is the output produced by the following code?

```java
int numItems = 6;
int boxesFilled = 0;

while ((numItems > 0) && (boxesFilled <= 3)) {
    for (int j=0; j<2; j++)
        numItems--;
    boxesFilled++;
    System.out.print (boxesFilled + " box");
    if (boxesFilled > 1)
        System.out.print ("es");
    System.out.println (" filled, " + numItems + " items remaining");
}
```

17) [20 points] Write a loop that produces the following output:

```
*
***
*****
```
18) [15 points] List each variable in the following code and specify its scope (class or method):

```java
public class MidTermExam
{
    private int totalQuestions;

    public int calcScore (int questionsMissed)
    {
        double score;

        score = (double) (totalQuestions - questionsMissed) / totalQuestions;

        return (score);
    }
}
```

19) [20 points] Given the following code (that includes no braces or indentation) and output, rewrite the code with braces and indentation so that the same output is produced and the intent of the code is clear.

```java
Code
int i=0;
int j=6;
while (i<j)
    if (((j-i) > 3))
        i++;
    else
        j--;
System.out.print ("i is " + i);
else
    System.out.println (" j is " + j);

Output
i is 1 j is 6
i is 2 j is 6
i is 3 j is 6
j is 5
j is 4
j is 3
20) [25 points] Given the Card class on page 9 of the exam:

a) [5 points] Write the statement to create an instance of this class.

b) [5 points] Write the statement to call the showCard method of this class, using the object you created in part a.

c) [15 points] Predict the output of the method call you wrote in part b.

Extra Credit [10 points]

Write a method(s) that when passed 0, 1, or 2 parameters will print out the number of parameters passed to it. For example, if the method call gives no parameters, the method will print out

There were no parameters passed to this method.

If the method call gives 1 parameter, the method will print out

There was 1 parameter passed to this method.

And so on...
public class Card {
    int face;
    int suit;

    public Card () {
        face = 1;
        suit = 1;
    }  

    public String faceToString() {
        String faceString = "";
        if ((face >= 2) && (face <= 10)) {
            faceString = faceString.valueOf(face);
        } else {
            switch (face) {
                case 1:
                    faceString = "Ace";
                    break;
                case 11:
                    faceString = "Jack";
                    break;
                case 12:
                    faceString = "Queen";
                    break;
                case 13:
                    faceString = "King";
                    break;
            }
        }
        return (faceString);
    }

    public String suitToString() {
        String suitString = "";
        switch (suit) {
            case 1:
                suitString = "Spades";
                break;
            case 2:
                suitString = "Hearts";
                break;
            case 3:
                suitString = "Clubs";
                break;
            case 4:
                suitString = "Diamonds";
                break;
        }
        return (suitString);
    }

    public void showCard() {
        System.out.println(faceToString() + " of " + suitToString());
    }
}