Name: _____

GT Number: _____

TA: _____

Commenting your code on this test is optional, however it may help the grader understand your code better. Other style issues such as using good variables names and using abstraction are still required. Write your gt number in the spaces provided and color in the corresponding numbers and letters.

gt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	d	e	f	g	h	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-
	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

Problem	Points Possible	Points Received	Graded By
1	10		
2	20		
3	10		
4	16 (+2 xtra)		
5	8		
6	11		
7	25		
TOTAL	100		

Please remember: Any academic misconduct (including, but not limited to, the list below) could result in a 0 (zero) on the exam and/or an F grade in the course:

- Communication with anyone other than a proctor for ANY reason in ANY language in any manner.
- Sharing of ANYTHING (e.g. pencils, paper, erasers).
- Writing on paper that is not given to you by a proctor.
- Failure to follow directions given by the proctor.
- Failure to stop writing when the allowed time is up (as reported by the proctor).
- Use of cell phones, beepers, handheld computers, calculators, during the exam.
- Using books or other reference material.
- Disruption of the exam setting.

By taking this exam, you signify that it is your work and that you have neither given nor received inappropriate help during the taking of this exam in compliance with the Academic Honor Code of Georgia Tech.

Signature: _____

(you must sign this for your exam to be graded!)

1. Vocabulary Terms – Short Answer

Define the terms listed below.

2 (a) object

2 (b) class

2 (c) byte code

2 (d) instance variable

[2] (e) local (or stack) variable

2. Language Concepts – Short Answer

Provide a 2-3 sentence answer or explanation to the following:

5 (a) How does Java provide cross platform portability of code? Provide two or three specific facts or details.

5 (b) Describe the Java compilation and execution process, listing specific steps and commands.

[5] (c) List and describe two features that any object oriented programming language must have. What are these features called? Describe them.

[5] (d) Compare and contrast abstraction to encapsulation. How are they similar? How are they different?

3. Bug Parade

In the following fragments of code, identify the errors, based on the context given for each problem.

5 (a) The following code fails to compile. The compiler halts at the third line, and states that the error is an "else without an if". Identify the error, and rewrite the code fragment so that it works. (You may assume that the fragment appears in a proper class and method, and that all variables are properly declared; just focus on the fragment of code.)

```
if (x > 10);
    System.out.println ("X is larger than ten");
else
    System.out.println ("X is smaller than ten");
```

5 (b) The following code fragment was designed to print out the numbers from 0 to 9, inclusive. But when executed, it just prints out "11" and nothing else. Identify the error or errors, and fix them. (As before, assume the code fragment appears in a proper class and method.)

```
int i;
for (i = 0; i <= 10; i++);
    System.out.println(i);
```

4. Assorted Language Features – Short Answer

[4] (a) List four signed data types (i.e., data types that are capable of holding positive and negative numeric values) in Java:

[2] (b) For **extra credit**, list the data types from (a) above in increasing order of magnitude, not memory size. That is, list the types **not** based on the number of bits they take up in memory, but based on the magnitude of the values they can potentially hold.

6 (c) Demonstrate (briefly) three techniques for commenting in Java.

6 (d) What is the minimum number of times the following loop constructs are *guaranteed* to execute:

i. A for loop

ii. A do-while loop

iii. A while loop

[8] 5. Code Fragments

[8] Rewrite the following lines of code so they do not use short-hand expressions. (Your answer may include more than one line.)

(a)
```
i++;
```

(b)
```
x+=5;
```

(c)
```
x+= (++x);
```

(d)
```
i--;
```

11 6. Casting and Data Types

11 For each fragment below, identify whether the code would result in an error. If the code fragment is fine, write "OK" next to the problem. If the code fragment is not valid, write "ERROR", and rewrite the line so that it is correct, and accomplishes some useful purpose. (I.e., don't just comment out the code to fix it!) There may be many possible rewrites; however, you should not change the declared type of any variable. If you leave an answer blank, it will be marked wrong.

Hint: Each one is only worth 1 point! Don't waste time.

(a)
```
int i = 40;
short s = i;
```

(b)
```
float pi = 3.14159256;
```

(c)
```
double pi = 3.14159265;
```

(d)
```
long ssn = 123456789L;
int  y = (int) ssn;
ssn  = y;
```

(e)
```
long ssn = 123456789L;
int  y = (int) ssn;
ssn  = (float) y;
```

(f)
```
int x, y = 5;
x = (int) ((long) y);
```

(g)
```
double pi = 3.14159f;
float x = pi;
```

(h)
```
int x = 2;
int y = 5;
float z = x/y;
```

(i)
```
int x = 2;
int y = 5;
float z = (long) x/y;
```

(j)
```
int y = 4;
boolean b = (y++ > 4 && --y < 10);
```

(k)
```
int y = 4;
int x = y;
```

25 7. Short Coding

15 (a) Rewrite the following block of code so that it uses a case switch statement, and accomplishes the same outcome. You may omit the comments in your rewrite. Assume the fragment appears in a proper class and method.

```
/* This code determines the number of days in a month,
   with the month expressed as a number: January == 1,
   February == 2, etc.  */

int month = getMonthByNumber();
boolean bLeapYear = false;
int daysInMonth = -1;

/* Thirty days has September, April, June, and November ... */
if (month == 4 || month == 6 || month == 9 || month == 11)
  daysInMonth = 30;

/*  ... Excepting February which hath but 28 */
else if (month == 2) {
  if (bLeapYear)
    daysInMonth = 29;
  else
    daysInMonth = 28;
}

/*  ... all the rest have thirty one */
else
  daysInMonth = 31;
```

(You may use this page for your answer to the previous coding question).

10 (b) Rewrite the following code from a "for loop" to a "do...while" loop. The output should remain the same. That is, make sure your code behaves the same as the code below. You may omit the comments in your rewrite. As before, assume the fragment appears in a proper class and method.

```
/* print out numbers divisible by 3 */
for (int i=0; i < 30; i++){
  int remainder = i % 3;
  if (remainder == 0){
    System.out.println (i);
  }
}
```