

**CS101, TEST 1, MONDAY, MARCH 2, 2009,  
PROF. LOFTIN  
SOLUTIONS**

(1) (10 pts) What is the output of the following program?

```
public class FirstProgram{
    public static void main(String[] args){
        int a=1, b=2;
        a++;
        b += a;
        if (b==4)
            a++;
        else
            a--;
        System.out.println (a + "\n" + b);
    }
}
```

Output:

3  
4

(2) (10 pts) What is the output of the following program?

```
public class SecondProgram{
    public static void main(String[] args){
        String s = "Happy Birthday", t, u;
        t = s.toUpperCase();
        u = t.concat(" to you!");
        System.out.println(u);
    }
}
```

Output:  
HAPPY BIRTHDAY to you!

- (3) (10 pts) What is the output of the following program?

```
public class ThirdProgram{
    public static void main (String[] args){
        for (int i=1; i<=3; i++){
            for (int j=1; j<=4; j++)
                System.out.print("*");
            System.out.println();
        }
    }
}
```

Output:  
\*\*\*\*  
\*\*\*\*  
\*\*\*\*

- (4) (15 pts) Write a Java program which prompts the user for a number  $x$ , and then prints out the value  $\sqrt{x^2 + 1}$  to the screen.

**Solution:**

```
import java.util.Scanner;
public class Problem4{
    public static void main(String[] args){
        double x;
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter a number: ");
        x = scan.nextDouble();
        System.out.println(Math.sqrt(x*x+1));
    }
}
```

- (5) (2 pts each) Multiple choice (circle the correct answer)
- (a) A megabyte consists of approximately how many bytes?
- (i) 1024
  - (ii) 1000

- (iii) one million  
 (iv) one billion
- (b) Assume `page` is an object of class `Graphics`. Then the method call to draw a circle of radius 50 centered at (100, 150) is
- (i) `page.drawOval(100,150,50,50);`  
 (ii) `page.drawOval(50,50,100,150);`  
 (iii) `page.drawOval(50,100,50,50);`  
 (iv) `page.drawOval(100,150,50);`
- (c) Let `a` and `b` be `double` type variables. The mathematical expression
- $$\frac{1}{ab + 2}$$
- can be written in Java as
- (i) `1/ab+2`  
 (ii) `1/(ab+2)`  
 (iii) `1/a*b+2`  
 (iv) `1/(a*b+2)`
- (d) The `char` constant representing the lower-case letter a is
- (i) `a`  
 (ii) `'a'`  
 (iii) `"a"`  
 (iv) None of the above
- (e) Each of the following is a valid Java identifier EXCEPT
- (i) `_23a`  
 (ii) `if`  
 (iii) `variable_name`  
 (iv) `X14`
- (f) This expression evaluates to 20 in Java
- (i) `4(5)`  
 (ii) `4/5 + 20`  
 (iii) `3*5 + 6`  
 (iv) `40 % 2`
- (g) All of the following are examples of software EXCEPT
- (i) compiler  
 (ii) ROM  
 (iii) operating system  
 (iv) your program `Program1.java`
- (h) The floating-point number one third is represented by this Java expression.
- (i) `1/3`  
 (ii) `1%3`

- (iii) 1./3.  
 (iv) 1.%3.
- (i) ----- is a programming language only one level above machine language.  
 (i) Assembly language  
 (ii) Java  
 (iii) Executable file  
 (iv) Object-oriented language
- (j) The following piece of code prints out **YES** to the screen if the `int` variable `a` is equal to 4 and does nothing if `a` is not equal to 4.
- (i) `if (4==a);  
     System.out.println("YES");`
- (ii) `if (4=a)  
     System.out.println("YES");`
- (iii) `if (4==a)  
     System.out.println("YES");`
- (iv) `if (4==a);  
     else System.out.println("YES");`
- (6) (2 pts each) True/False. Circle T or F to the left of each expression.
- T** **F** Register is a type of memory.  
**T** **F** In a Java program, `a++` always has exactly the same meaning as `++a`.  
**T** **F** Bugs Bunny is an object of the class `Cartoon Character`.  
**T** **F** US President is an object of the class `Barack Obama`.  
**T** **F** Java is an object-oriented programming language.
- (7) (2 pts each) Fill in the blanks:
- (a) Each byte represents **8** bits.  
 (b) The value of the variable `a` after the following code fragment executes is **10**.  
`int a = 5;  
 a = a*2;`
- (c) The value of the Java expression `17%5` is **2**.