

Problem Set Two, part 1

This assignment must be electronically submitted prior to 5 PM on Monday, October 5.

Precise instructions for submitting Java homework is at

<http://www.fas.harvard.edu/~libe50a/homework.html>

Part A — Reading

Read or browse through the first 2 chapters in the Reges and Stepp textbook.
Now solve the following problems.

Part B — Simple Exercises (20 points total)

Type up answers to the following five problems in a simple “text file”
without writing complete Java programs.

[1] 3 points

Precisely what does this program print when executed?

```
class Prob1
{
    public static void main (String [] args)
    {
        System.out.print("She said, \"");
        System.out.print("Never put off till tomorrow ... ");
        System.out.println("\nWhat you can do");
        System.out.print("The day"); System.out.println();
        System.out.println("After tomorrow!\");
    }
}
```

[2] 3 points (1 point for each)

Precisely what is printed by each of the following?

- (a) `System.out.println("3 + 4");`
- (b) `System.out.println(3 + 4);`
- (c) `System.out.println(3 + "4");`

[3] 4 points

Consider the following program, and the resulting error messages that occur when the program gets compiled using the "javac" command. In 1 or 2 simple English sentences, explain why the error messages occurred:

```
// This program does not compile. How come?
public class BadExample
{
    public static void main(String[] args)
    {
        int x = 3;
        int y = 7;
        computeSum();
    }

    public static void computeSum()
    {
        int sum = x + y;
        System.out.println("sum = " + sum);
    }
}
```

Here is what was output after we attempted to compile this program:

```
BadExample.java:10: cannot find symbol
symbol   : variable x
location: class BadExample
    int sum = x + y; // illegal, x/y are not in scope
              ^
BadExample.java:10: cannot find symbol
symbol   : variable y
```

```

location: class BadExample
    int sum = x + y; // illegal, x/y are not in scope
                    ^
BadExample.java:10: incompatible types
found   : java.lang.String
required: int
    int sum = x + y; // illegal, x/y are not in scope
                    ^
3 errors

```

[4] 4 points

To convert a temperature from Fahrenheit degrees to Kelvin (absolute), the following relationship holds:

$$^{\circ}\text{K} = \frac{5}{9} (^{\circ}\text{F} - 32) + 273.16$$

Write a single *Java* statement that will print the Kelvin equivalent of any Fahrenheit temperature, based upon the current value of numeric variable named **fahrenheit**. This problem is similar, but simpler, than a programming problem you already solved using *Scratch*.

[5] 6 points total

Part (a): 3 points

Precisely what does the following program output when it is executed?

```

class Strange
{
    static void first()
    {
        System.out.println("Inside first method!");
    }

    static void second()
    {
        System.out.println("Inside second method!");
        first();
    }
}

```

```
static void third()
{
    System.out.println("Inside third method!");
    first();
    second();
}

public static void main (String [] args)
{
    first();
    third();
    second();
    third();
}
}
```

Part (b): 3 points

What would have been the output of the preceding program if the method **third** had instead been written like this?

```
static void third()
{
    first();
    second();
    System.out.println("Inside third method!");
}
}
```

Part C — Main Programming Problems (25 points total)

Solve the following problems using the *javac* compiler and your Unix computer account on **nice.harvard.edu**!

Please be certain you have correctly activated your FAS computer account and that you understand how to login and logout.

[6] 6 points

Use file *Prob6.java*

Carefully type the following program into a file named **Prob5.java** after logging in to your FAS account. You will need to use a “text editor,” such as *nano*, *pico*, *emacs*, or *vi* in order to create and edit this file.

```
class Prob4
{
    public static void main (String [] args)
    {
        x = 17;
        System.out.println ( x*x );
    }
}
```

Now attempt to compile this program using *javac*, and you will discover 3 errors are produced by the Java compiler. All the errors are due to a simple omission in the above program. Fix this program so that the program will compile and work correctly.

[7] 9 points

Use file *Diamond.java*

Write a complete Java program to produce precisely the following output:

```
    D
   I I
  A  A
 M   M
 O   O
  N N
   D
```

[8] 10 points**Use file *Prob8.java***

Consider the following *Java* method that outputs four times a quote from a famous computer scientist named Brian Kernighan:

```
static void print4x()  
{  
    System.out.println("Controlling complexity is the essence of programming!");  
    System.out.println("Controlling complexity is the essence of programming!");  
    System.out.println("Controlling complexity is the essence of programming!");  
    System.out.println("Controlling complexity is the essence of programming!");  
}
```

Use this **print4x** method in a complete *Java* program that outputs the Kernighan quote *64 times*. Your solution must contain a **main** method, the **print4x** method, and at least one additional method. You should not use any **for** loops or **while** loops or anything like that — just method calls!



“And just what was that little window you clicked off when I came in?”