



## Java API Reference

The following excerpt from the Java API is provided for your assistance. Feel free to use any portion of it.

### String class

```
String(String str)
char charAt(int index)
int compareTo(String str)
String concat(String str)
boolean equals(String str)
int length()
String substring(int offset, int endIndex)
```

### Random class

```
Random()
Random(long seed)
int nextInt()
int nextInt(int num)
float nextFloat()
```

### Scanner class

```
Scanner(InputStream source)
String next()
String nextLine()
int nextInt()
float nextFloat()
double nextDouble()
boolean hasNext()
```

1. **True/False [ 18 pts ]**

Answer the following questions True or False. Be sure to write out True and False, NOT just a T or F.

- 3 (a) `boolean` is an integer type, and so are `short` and `byte`.
- 3 (b) The command `javac MyApplet.java` will compile the file and create a `MyApplet.class` file.
- 3 (c) Multiple reference variables can refer to the same object.
- 3 (d) Applets are java programs that are usually transported across a network and executed using a Web browser.
- 3 (e) Java's coordinate system has the origin in the LOWER LEFT corner and all visible coordinates are positive.
- 3 (f) A programmer can, in Java, define a new type called `IceCream` with values `Vanilla`, `Chocolate`, and `Strawberry`.

## 2. Applets and Graphics [15 pts ]

Please draw the applet which shows up after running the program below. Assume that the applet window drawn below is 200 x 200.

```
import javax.swing.JApplet;
import java.awt.*;

public class MyApplet extends JApplet{

    public void paint(Graphics g){
        setBackground(Color.white);
        g.setColor(Color.black);
        g.fillRect(10,50,120,10);
        g.fillRect(30,60,20,20);
        g.drawRect(90,60,20,20);
        g.fillOval(90,30,20,20);
        g.drawString("I love Peach",130,60);
    }
}
```

**3. Types and Declarations [ 20 pts ]**

If the following line of code would not generate any errors when compiled, write “Legal”.  
If it will generate a compilation error, write “Not legal” and explain the problem.

(a) `float f = (float)3.5;`

(b) `int void = 11;`

(c) `double d = -5;`

(d) `char c = '2';`

(e) `int s = 3 * 5 / 2.5;`

**4. Strings [ 15 pts ]**

Write a class named `StringFun` that reads a string (possibly multiple words) from the command line and then prints out the last character from that string back to the user.

**5. Types, Expressions, and Operators [ 16 pts ]**

Write the value and the data type of the expression in the space provided below

**4** (a)  $8 - (6 * (5 * (3 / 1.5))) + 2$

Value:

Type:

**4** (b)  $9 / 6 + 8 * 3 - 10$

Value:

Type:

**4** (c)  $(20 / 3) \% 4$

Value:

Type:

**4** (d)  $9 / (\text{float})3 + 2 - (7 / 2)$

Value:

Type:

**6. Math and Coding [ 14 pts ]**

Suppose that the hypothetical froogle function ( $fr(x)$ ) is calculated as  $\sqrt{x(x - 0.5)(x + 0.3)^2}$

Write a program (i.e., fill in the code below) that reads in a double value for  $x$ , calculates  $fr(x)$ , and then prints it out. Do all of this in the main method. Assume that you have access to the class Math that has static methods:

```
public static double sqrt(double a)
public static double pow(double a, double b)
public static double abs(double a)
```

---

```
import java.util.Scanner;
```

```
public class Froogle {
```

```
    // place main here
```

```
}
```

**7. EXTRA CREDIT [5 pts ]**

Consider the code segment below.

```
Random rand;  
int val;  
  
rand = new Random();  
val = Random.nextInt(10) + 1;  
System.out.println("Random number between 1 and 10 is " + val);
```

What is wrong with the code above? (You can assume that the java.util package was imported correctly, i.e., that is not the problem.)