println, in the System.out class, allows you to output a String.

System.out.println("Welcome to Vassar College!");

This method puts in a newline after printing the String. You can use the line System.out.println(); with no String argument to put a blank line in your output.

System.out.print("This is a line with no newline after it."); is a method that does not put in a newline. The problem with this is that it brings up the cursor immediately after the output.
System.out.println and print

Inside the String argument to println, any variable concatenated to a String using the + operator is automatically turned into a String.

    System.out.println("x is "+x+" and y is "+y);

At times, concatenating the empty String first causes all subsequent values to be converted to their String equivalent:

    char beta = 'B';
    String letters = ""; // set letters to empty string
    letters += "+beta+" ";
printf, in the System.out class, allows you to specify the number of places after the decimal point when printing a double. The printf method’s first argument is a String that contains a \textit{format string}. The format string is embedded in the String argument as \%1.2f as shown below and in Section 2.4.1 of our textbook.

\begin{verbatim}
System.out.printf("Your BMI is \%1.2f.\n", bMI);
\end{verbatim}

The \texttt{\textbackslash n} embeds a newline after the String is printed. The , separates the String with embedded format characters from the variable to be embedded in the String.

printf can be used to format any type of data.
Scanner, Sect.2.4.6

Scanner is a class in the java.util package that provides methods that take input from the keyboard. To use a Scanner to read from the keyboard (standard input), you need to instantiate an object of type Scanner.

```java
Scanner in = new Scanner(System.in);
System.out.println("Please enter a number.");
double rnum = in.nextDouble();
System.out.printf("Number in dollars is $%1.2f.\n", rnum);
```

The keyword new is used to create a new object of type Scanner.

The input is done by calling the nextDouble instance method of the new Scanner object.

System.in refers to the keyboard.
JOptionPane

Class in the javax.swing package that provides another way of taking input from the keyboard. To use a JOptionPane to read from the keyboard (standard input), you need to call a static method in the JOptionPane class.

```java
String in = JOptionPane.showInputDialog("Please enter a line of text");
```

This causes a pop-up dialog box to appear with a blank for input.

For output, use another static method from the JOptionPane class:

```java
JOptionPane.showMessageDialog(null,"The answer is 42");
```

null is the default value for any object type. In graphics programs, this is often a JFrame.