1.18 What is the command to compile a Java program? What is the command to run a Java program?

1.19 If a NoClassDefFoundError occurs when you run a program, what is the cause of the error?

1.20 If a NoSuchMethodError occurs when you run a program, what is the cause of the error?

1.21 Why does the System class not need to be imported?

1.22 Are there any performance differences between the following two import statements?

```
import javax.swing.JOptionPane;
import javax.swing.*;
```

1.23 Show the output of the following code:

```
public class Test {
    public static void main(String[] args) {
        System.out.println("3.5 * 4 / 2 - 2.5 is ");
        System.out.println(3.5 * 4 / 2 - 2.5);
    }
}
```

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**Programming Exercises**

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Note

Solutions to even-numbered exercises are on the Companion Website. Solutions to all exercises are on the Instructor Resource Website. The level of difficulty is rated easy (no star), moderate (*), hard (**), or challenging (***)

1.1 (Displaying three messages) Write a program that displays Welcome to Java, Welcome to Computer Science, and Programming is fun.

1.2 (Displaying five messages) Write a program that displays Welcome to Java five times.

1.3* (Displaying a pattern) Write a program that displays the following pattern:

```
J A V V A
J A A V V A A
J J AAAAA V V AAAAA
J J A A A V V A A A
```

1.4 (Printing a table) Write a program that displays the following table:

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>a^2</th>
<th>a^3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

1.5 (Computing expressions) Write a program that displays the result of

\[
\frac{9.5 \times 4.5 - 2.5 \times 3}{45.5 - 3.5}
\]
1.6 \textit{(Summation of a series)} Write a program that displays the result of 
$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$.

1.7 \textit{(Approximating $\pi$)} $\pi$ can be computed using the following formula:

$$
\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} + \cdots\right)
$$

Write a program that displays the result of $4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13}\right)$. Use $1.0$ instead of $1$ in your program.