The **while** loop

Syntax:

```plaintext
while ( <condition> ) <statement>
```
The **while** loop

Syntax:

```
while ( <condition> ) <statement>
```

Semantics:

```
Top: if ( <condition> ) {
    <statement>
goto Top;
}
```
Average1.java
The **do/while** loop

**Syntax:**

```java
do {
    <statements>
} while ( <condition> )
```
The **do/while** loop

Syntax:

```plaintext
do {
    <statements>
} while ( <condition> )
```

Semantics:

```plaintext
<statements>
while ( <condition> ) {
    <statements>
}
```
Average2–4a.java
The **for** loop

**Syntax:**

```java
for ( <expr>1 ; <expr>2 ; <expr>3 )
<statement>
```
The **for** loop

Syntax:

```plaintext
for ( <expr>₁ ; <expr>₂ ; <expr>₃ )  <statement>
```

Semantics:

```plaintext
<expr>₁;
while ( <expr>₂ ) {
  <statement>
  <expr>₃
}
```
the for loop and \textbf{definite iteration}

\begin{verbatim}
for (i = 0; i < n; i++)
  <statement>
\end{verbatim}

executes loop body \( n \) times, for \( i = 0, 1, \ldots, n - 1 \)
the for loop and **definite iteration**

```cpp
for (i = 0; i < n; i++)
    <statement>
```

executes loop body $n$ times, for $i = 0, 1, \ldots, n - 1$

$i$ is called the **loop index**
the for loop and **definite iteration**

```c
for (i = 0; i < n; i++)
    <statement>
```

executes loop body $n$ times, for $i = 0, 1, \ldots, n - 1$

$i$ is called the **loop index**

the loop index may be declared within the for loop itself:

```c
for (int i = 0; i < n; i++)
    <statement>
```
the for loop and **definite iteration**

```c
for (i = 0; i < n; i++)
    <statement>
```

executes loop body $n$ times, for $i = 0, 1, \ldots, n - 1$

$i$ is called the **loop index**

the loop index may be declared within the for loop itself:

```c
for (int i = 0; i < n; i++)
    <statement>
```

in this case, the variable $i$ is not "visible" outside the loop
the for loop and **definite iteration**

```c
for (i = 0; i < n; i++)
    <statement>
```

executes loop body *n* times, for *i* = 0, 1, . . . , *n* − 1

*i* is called the **loop index**

the loop index may be declared within the for loop itself:

```c
for (int i = 0; i < n; i++)
    <statement>
```

in this case, the variable *i* is not "visible" outside the loop

**Recommendation:** only use the for loop for definite iteration
Average5–7.java
I/O redirection