`Boolean` and `if`

`if` : Chaining and Nesting

Lecture Contents

- Review
  - The `boolean` type
  - Comparison Operators
  - The `if` statement
  - The `if..else` statement
- Chaining
- Nesting

The `boolean` Type

- The `boolean` type can take only two values, namely:
  - `true`
  - `false`
- Declaration of a boolean variable follows the same format as `int` and `double`:

```
boolean myBool = true;
```

Comparison Operators

Symbol	Name
==	equal to
!=	not equal to
>	greater than
>=	greater than or equal to
<	less than
<=	less than or equal to

** Comparison operators return **`boolean`** **

The `if` Statement

```
public static void main(String args[]) {
  System.out.println("Starting Program...");
  if(true) {
    System.out.println("Hello World!");
  }
  System.out.println("Finished Program!");
}
```

```
Starting Program...
Hello World!
Finished Program!
```

The `if` Statement

```
public static void main(String args[]) {
  System.out.println("Starting Program...");
  if(false) {
    System.out.println("Hello World!");
  }
  System.out.println("Finished Program!");
}
```

```
Starting Program...
Finished Program!
```

The `if..else` Statement

```
public static void main(String args[]) {
   System.out.println("Starting Program...");
   if(true) {
      System.out.println("Hello World!");
   } else {
      System.out.println(“Goodbye cruel world…”);
   }
   System.out.println("Finished Program!");
}
```

```
Starting Program…
Hello World!
Finished Program!
```

The `if..else` Statement

```
public static void main(String args[]) {
   System.out.println("Starting Program...");
   if(false) {
      System.out.println("Hello World!");
   } else {
      System.out.println(“Goodbye cruel world…”);
   }
   System.out.println("Finished Program!");
}
```

```
Starting Program…
Goodbye cruel world...
Finished Program!
```

Chaining

- `if` gives a “one-way selection”
- `if..else` gives a “two-way selection”
- What if you want more…?

Chaining

```
public static void main(String args[]) {
   printIsPositiveNegative(-7);
   printIsPositiveNegative(0);
   printIsPositiveNegative(200);
}

public static void printIsPositiveNegative(int i) {
   if(i > 0) {
      System.out.println(i + " is positive.");
   } else if (i < 0) {
      System.out.println(i + " is negative.");
   } else {
      System.out.println(i + " is neither positive nor negative");
   }
}
```

Chaining

```
public static void main(String args[]) {
   printIsPositiveNegative(-7);
   printIsPositiveNegative(0);
   printIsPositiveNegative(200);
}

public static void printIsPositiveNegative(int i) {
   if(i > 0) {
      System.out.println(i + " is positive.");
   } else if (i < 0) {
      System.out.println(i + " is negative.");
   } else {
      System.out.println(i + " is neither positive nor negative");
   }
}
```

```
-7 is negative.
0 is neither positive nor negative
200 is positive.
```

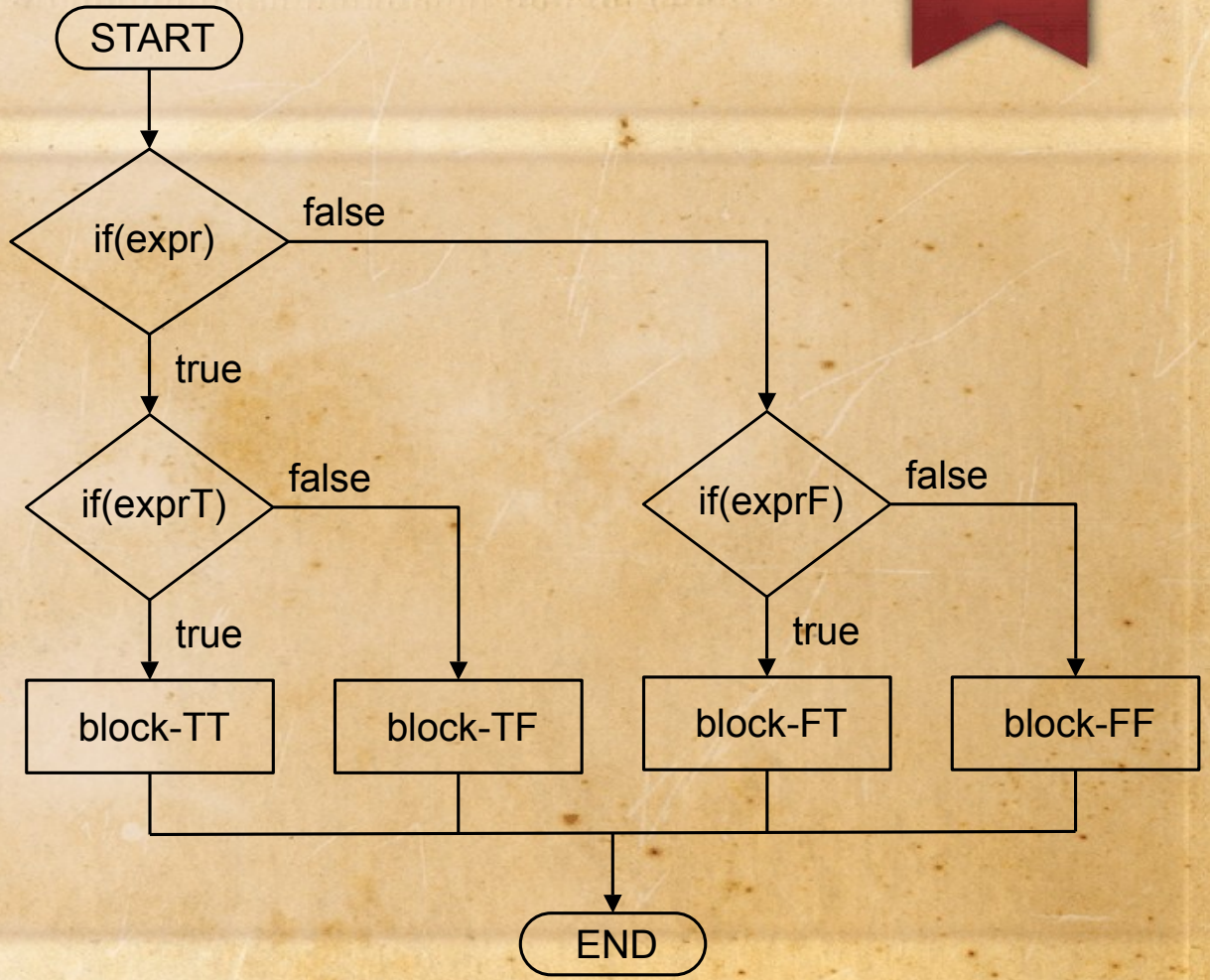
Nesting

```
public static boolean canDrink(int age, boolean American) {
   if(American) {
      if(age >= 21) {
         return true;
      } else {
         return false;
      }
   } else { // if not American, then Canadian
      if(age >= 19) {
         return true;
      } else {
         return false;
      }
   }
```

Summary

- Nesting

```
if (expr) {
   if (exprT) {
      … block-TT …
   } else {
      … block-TF …
   }
} else {
   if (exprF) {
      … block-FT …
   } else {
      … block-FF …
   }
}
```



Summary

- Chaining

```
if (boolOne) {
 …
} else if (boolTwo) {
 …
} else if (boolThree) {
 …
} else {
 …
}
```

- Nesting

```
if (boolOne) {
   if (boolTwo) {
      …
   } else {
      …
   }
} else {
   if (boolTwo) {
      …
   } else {
      …
   }
}
```

Summary

- `boolean` expressions and `if` statements
  - AP Exam Weighting: **15% - 17.5%**

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