Primitive Data Types

In PowerPoint, point at the speaker icon, then click the "Play" button.

Primitive Data Types

- There are eight *primitive data types* in Java
- Four of them represent integers:
  - **`byte`**, **`short`**, **`int`**, **`long`**
- Two of them represent floating point numbers:
  - **`float`**, **`double`**
- One character type: **`char`**
- One boolean type: **`boolean`**
- Their properties and differences are explained on following slides.

Click on slide to display successive lines

Numeric Primitive Data

- The difference between the various integer primitive types is their size, and therefore the range of values that they can store:

Type	Min Value	Max Value
`byte`	-128	127
`short`	-32,768	32,767
`int`	-2,147,483,648	2,147,483,647
`long`	$< -9 \times 10^{18}$	$> 9 \times 10^{18}$

Commonly used type

Floating Point Types

Type	Min Value	Max Value
`float`	+/- 3.4 x 10^{38} with 7 significant digits	
`double`	+/- 1.7 x 10^{308} with 15 significant digits	

Commonly used type

- For example,

```
double score;
score = 78.4;
```

Characters

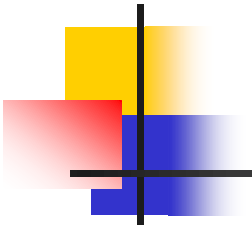
- A **`char`** variable stores a single character.
- Character literals are delimited by single quotes:

```
'a'   'X'   '7'   '$'   ','   '\n'
```

- Example declarations:

```
char topGrade = 'A';

char terminator = ';', separator = ' ';
```



Character Sets

- A *character set* is an ordered list of characters, with each character corresponding to a unique number
- A **`char`** variable in Java can store any character from the *Unicode character set*
- The Unicode character set uses sixteen bits per character, allowing for 65,536 unique characters

Characters

- The *ASCII character set* is older and smaller than Unicode, but is still quite popular.
- The ASCII characters are a subset of the Unicode character set, including:

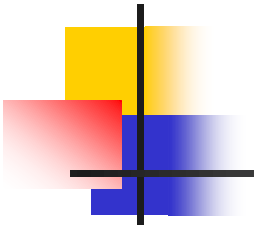
uppercase letters	A, B, C, …
lowercase letters	a, b, c, …
punctuation	period, semi-colon, …
digits	0, 1, 2, …
special symbols	&, |, \, …
control characters	backspace, tab, ...

Boolean

- A **`boolean`** value represents a true or false condition.
- The reserved words **`true`** and **`false`** are the only valid values for a boolean type

```
boolean done = false;
```

- A **`boolean`** variable can also be used to represent any two states, such as a light bulb being on or off



Exercises

- Declare an integer variable *cardsInHand* and initialize it to 13 .

- Declare a double variable *temperature* and initialize it to 98.6 .

Try this for yourself. Answers on the next slide.

Exercise Answers