Week00

- introduce self
- take roll
- syllabus
- type
- whitespace
- scope
- success tips
- fix Eclipse installs

NOTE: lecture is recorded and posted ~noon same day

introduce self

[other slide deck]

take roll

take roll

- this is the only time i will ever take roll
- please correct me if i mispronounce your name
- if you are not yet enrolled, fill out other sheet now

syllabus

syllabus

the syllabus is online

https://github.com/james-bern/CS136/wiki

grading

final grade

- **final grade** is 1/3 homework, 1/3 midterm exam, 1/3 final exam
  - **homework** is on an A- (90), A (95), A+ (100) scale, A++ (105) scale
    - A- is meant to be doable
    - A is meant to be challenging
    - A+ is meant to be *a growth opportunity* 🪴
    - i will go over your homework with you during lab and ask you questions about it 😀👍
  - **exams** are in-person, on-paper, no-notes
    - questions are either similar to homework, or similar to PracticeExam
      - "if you understand the homework, the exam should be unsurprising and approachable"

😈 ChatGPT

ChatGPT can do every homework in this class up to an A level

😈

it is impossible for me to prove whether or not you used ChatGPT

(people who say otherwise are wronggg)

so, ChatGPT, etc. are "allowed," but...

- you are not allowed copy and paste code from anywhere
  - bad bad very bad don't do it
  - (unless i gave you the code then it's fine 😊 👍)
- you can't use ChatGPT, etc. on exams
- 🤖 "if your coding job can be done by an AI, then it will be done by an AI"

collaboration

When you help another student with their code, your own code should remain 50 feet away. Help them with your brain, not your own solution.

questions?

type

type

variables in Java have a specified type

```
# okay in Python
foo = 7     # foo is an int
foo = False # now, foo is a boolean
```

```
// NOT okay in Java
int foo = 7; // foo is an int
foo = false; // Error: incompatible types:
             // boolean cannot be converted to int
```

declaring and **initializing** are separate things

- ```
  // Option A: one line
  int foo = 7; // declare int foo and initialize it to 7
  ```
- ```
  // Option B: two lines
  int foo; // declare a variable foo of type int
  foo = 7; // initialize foo to 7
  ```

primitive types

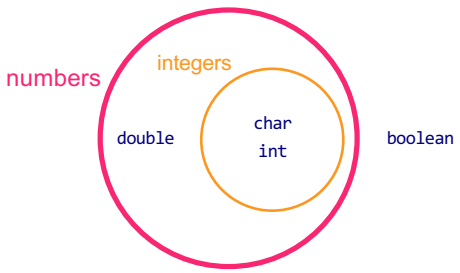
primitive types

- in this class, "a variable being a **primitive**" means that the variable is a `boolean`, `char`, `double`, or `int`
- primitive types are simple
- primitive types are small
- primitive types are NOT Objects
  - we will talk about Objects later
  - **examples of Objects:** `String`, `MyCoolClass`, `int[]` (array of ints)

`boolean`, `char`, `double`, `int`

- a **`boolean`** stores a truth value
  - `true`, `false`
- a **`char`** stores a character
  - `'\0'`, `'a'`, `'Z'`, `'!'`, `'\n'`
- a **`double`** stores a floating point number
  - `0.0`, `-0.5`, `3.1415926`, `Double.NEGATIVE_INFINITY`
- an **`int`** stores an integer number
  - `0`, `-1`, `4`

primitive data type Venn diagram



`char` is an integer type

- a **`char`** is an integer type
  - each `char` has a corresponding integer, for example (`'a'` == 97)
  - the letters are in order (`'a'` == 97), (`'b'` == 98), (`'c'` == 99)...
  - the numbers are also in order (`'0'` == 48), (`'1'` == 49)...
  - you can do math with `char`'s
    - `char foo = 'a' + 2; // foo is 'c'`
    - `char bar = '0' + 7; // bar is '7'`
    - `int  baz = '6' - '0'; // baz is 6`

zero

- each primitive data type has its own notion of what it means to "be zero"
  - `int     zero =     0;`
  - `double  zero =   0.0;`
  - `boolean zero = false;`
  - `char    zero =  '\0'; // the "null character"`

whitespace

whitespace

whitespace

- **whitespace** includes spaces, tabs, and newlines
- Python does care about whitespace (indentation *changes what code does*)
- **Java does NOT care about whitespace**
- do *you* care about whitespace?
  - some guidelines:
    - be consistent
    - make sure your curly braces line up
    - ✨ use Eclipse's auto-indentation feature (see Tut00)! no excuses!

sparks joy	NOT equivalent -- doesn't spark joy

`for (int i = 0; i < 10; ++i) {`
`  if (i % 3 == 0) {`
`  System.out.println("fizz");`
`  }`
`}`
	`for (int i = 0; i < 10; ++i) {`
	`  if (i % 3 == 0) {  }`
	`  System.out.println("fizz");`
	`}`

scope

scope

scope

- a **scope** is a region of code in which variables live
  - in Java, a scope is (usually) defined by a pair of curly braces
    - `OUTER_SCOPE { INNER_SCOPE } OUTER_SCOPE`

```
{
    int i;
    {
        int j;
        // you CAN use i here
        // you CAN use j here
    }
    // you CAN use i here
    // you CANNOT use j here
}
```

common scope-related errors

cannot find symbol (1/2)

```
Compile Error: cannot find symbol foo

class Main {
    public static void main(String[] arguments) {
        if (...) {
            int foo = 0;
        } else {
            int foo = 1;
        }
        PRINT(foo);
    }
}
```

cannot find symbol (2/2)

```
class Main {
    public static void main(String[] arguments) {
        int foo;
        if (...) {
            foo = 0;
        } else {
            foo = 1;
        }
        PRINT(foo);
    }
}
```

variable already defined (1/2)

```
Compile Error: variable foo is already defined in method

class Main {
    public static void main(String[] arguments) {
        int foo;
        if (...) {
            int foo = 0;
        } else {
            foo = 1;
        }
        PRINT(foo);
    }
}
```

variable already defined (2/2)

```
class Main {
    public static void main(String[] arguments) {
        int foo;
        if (...) {
            foo = 0;
        } else {
            foo = 1;
        }
        PRINT(foo);
    }
}
```

exceptions to the rule that "scope is the same as curly braces"

`for (...; ...; ...) { ... }`

- variables declared inside the parentheses of a **for loop** are not available outside of the for loop (this is probably the behavior you already expected)

```
Compile Error: cannot find symbol i

class Main {
    public static void main(String[] arguments) {
        for (int i = 0; i < 10; ++i) {
            ...
        }
        PRINT(i);
    }
}
```

if, else, for, while without braces (1/2)

- **if you (intentionally or unintentionally) forget your curly braces, then Java will assume you wanted them go around the first statement after the `if (...)`, `else`, `for (...)`, or `while (...)`**
  - **in this class, i highly recommend always using curly braces**

```
if (choice == 0)
    System.out.println("The user chose 0. What a fine choice");
```

```
if (choice == 0) {
    System.out.println("The user chose 0. What a fine choice");
}
```

if, for, while without braces (2/2)

```
if (choice == 0)
    PRINT("The user chose 0. What a fine choice");
else
    PRINT("The user did not choose 0.");
    PRINT("How avant-garde!");
```

```
if (choice == 0) {
    PRINT("The user chose 0. What a fine choice");
} else {
    PRINT("The user did not choose 0.");
} // whoops!
    PRINT("How avant-garde!");
```

questions?

success tips

success tips (1/3)

- establish basic study habits
  (this might not have been necessary in highschool; it most likely is now)
  - start homework early! (very hard to code well while stressed)
- don't work in a vaccuum
  - collaborate with your friends / acquaintences / enemies
  - come to help hours (they are there for you!)
- code a lot (ideally, 5+ days per week)
  - if the homeworks are feeling too hard, talk to me; we have **resources**!
  - if the homeworks are too easy, do the A+ / A++; do side projects;
    just keep coding; code code code code code; COOOOOOOOODE

success tips (2/3)

- try to find your own bugs
  - this is a huge skill; it takes time (and pain) to build
- try to answer your own questions using Google
  ("what does IDE stand for?"; "what does this error message mean?")
  - this is also a huge skill; it also takes time (and pain) to build
- however, if you are stuck (>= 10+ minutes of pain), ASK FOR HELP
  - there is literally no judgement here; we all have different starting points;
    my only goal is for all students to get stronger and have fun 😊👍
    - and, for what it's worth, i was a mechanical engineering undergrad
      and my first comp sci course was *terrifying* (though, eventually, fun)

most importantly though

you gotta push the button

fix Eclipse installs