CMPSC 100

Computational Expression

Practical 07

- Open the build.gradle file in the practical main directory and paste the following at the bottom (see course Slack channel #practicals for a copy-and-paste version):

```
run {
    standardInput = System.in
}
```

- This should enable a smoother run using:

```
gradle -q --console plain run
```

```
if(I.say(“poh-ta-toe”))
     you.say(“poh-tah-toe”);
```

Two forms (1 of 2)

```
if (temperature > 90.0)
     isHot = true;
```

General form:

```
if (condition)
     then do this
```

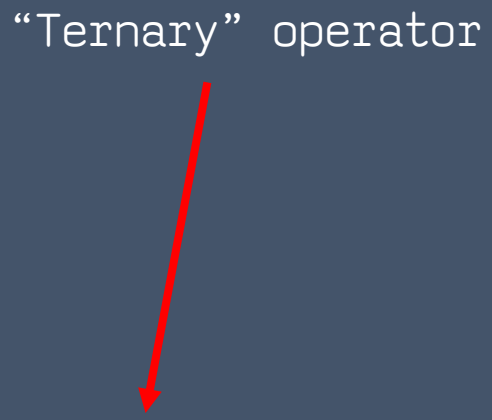
Two forms (2 of 2)

```
if (temperature > 100.0) {
        isHot = true;
} else {
        isHot = false;
}
```

General form:

```
if (condition) {
        then do this
} else {
        do this
}
```

|| this one == the “ternary”




```
boolean isHot = (temperature > 100.0) ? true: false;
```

A bit more complexity…

“Non-exclusive” or

```
if (temperature > 100.0 || isRaining) {
      me.setComfort = false;
} else if (temperature >= 60.0 && temperature <= 100.0){
      me.setComfort = true;
}
```

Inclusive “and”

A bit more complexity…

```
if (temperature > 100.0 && isRaining){
      isHot = true;
      isHumid = true;
} else if(temperature > 100.0) {
      isHot = true;
} else if (temperature < 60.0 && isRaining) {
      isDreary = true;
      professor.setPreference(isDreary);
}
```

Logical && Relational Operators

- &&
  - Boolean “and”
- ||
  - Boolean “or” (non-exclusive)
- <=
  - Arithmetic “less than or equal”
- >=
  - Arithmetic “greater than or equal”
- !=
  - Arithmetic “not equals”
- ==
  - Arithmetic “equals”
  - = is for assignment only!

As usual, story time.

The police have captured two legendary catnappers and are interrogating them in separate rooms, so they can't communicate with each other. Authorities accuse them of trying to catnap Ulysses! The police offer each the following deal:

(Don't worry, they were caught before serious hard could come to him)

- If Alice snitches on Bob, Alice goes free and Bob spends three years in jail.
- Similarly, if Bob snitches on Alice, Bob goes free and Alice spends three years in jail.
- If neither of them snitch on each other, then they both spend one year in jail.
- If they both snitch on each other, then they both spend two years in jail.

- The question presumes that freedom is preferable, though that choice may not always be the best one.
- To gain freedom, someone has to defect.
  - The question, then, becomes any one of four:
    - Does Alice defect?
    - Does Bob defect?
    - Do neither of them defect?
    - Do both defect?
- We can form a kind of truth table from this data.

What logical operator best describes this relationship?

&& (“and”!)

Alice defects	Bob defects	Sentences
T	F	Alice: 0, Bob: 3
F	T	Alice: 3, Bob: 0
T	T	Alice: 2, Bob: 2
F	F	Alice 1: Bob: 1 (and they catnap again!)

```
if(defectA && defectB) {
      yearsA += 2;
      yearsB += 2;
    } else if(defectA && !defectB) {
      yearsA  += 0;
      yearsB += 3;
    } else if(defectB && !defectA) {
      yearsA += 3;
      yearsB += 0;
    } else {
      yearsA = 1;
      yearsB = 1;
    }
```

Outcomes

Run your program using `gradle -q --console plain run`, and test the following scenarios:

- How many years does Alice get if she defects, but Bob doesn't?
- How many years does Alice get if Bob defects and she doesn't?
- How many years do Alice and Bob get if they both snitch on each other?
- How many years do Alice and Bob get if they don't snitch at all?
- BONUS: Do they ever catnap again!?