CS 11114

Introduction to Software Design

Spring 2017 - Michael Irwin

Introducing Program #2!


DIDNT WE JUST FINISH
A PROGRAMMING ASSIGNMENT?
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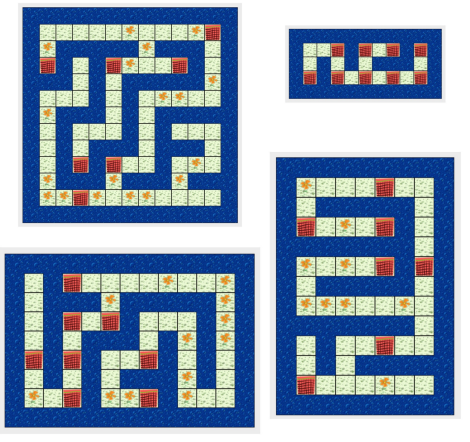
Program #2

- Due Thursday next week
- Goals:
  - Pick up all flowers
  - Remove all nets
  - Jeroo stops in bottom-right corner
- A random layout is used each time
- Think of your "walking the maze" strategy
- Will need to write tests to prove your Jeroo works (in next lecture)



Program #2 Tips

- You will need a loop in `myProgram` to run until you're done
  - When are you done? (see previous slide)
  - What's the opposite of that condition?
  - How do you actually code it?
- Make progress in your `while` loop
  - As mentioned in the spec, choose one preferred direction and stick to it

What is a boolean operator?

- First of all, what's an operator?
  - Simply performs a function on a value to (possibly) get a new value
- In math, what operators do you use?
  - Hint... addition, subtraction, multiplication, division, etc.
- When working with booleans, what changes can we make?

You already know one operator!

- `not (!)` is a unary prefix operator
  - unary - a single value being modified
  - prefix - appears before the value
- Simply says to turn the boolean into its opposite value

```
!true => false
!false => true
```

More legible code using equivalent conditions

- Make sure your code is written to be easy to understand
- For if/else statements, starting with a ! *usually* makes code harder to read
- Invert the condition (and body) to make it easier to read

```
if (!isClear(AHEAD)) {
    jumpHurdle();
}
else {
    hop();
}
```

```
if (isClear(AHEAD)) {
    hop();
}
else {
    jumpHurdle();
}
```

More complex operators

- In many cases, decisions aren't based on a single input
- Two new boolean operators - `and` and `or`
- `and` - **both** conditions must be true
  - If it's going to rain and the umbrella's indoors, grab the umbrella
  - If the music is too quiet and not at max, increase volume
- `or` - **one** of the conditions must be true
  - If it's raining now or going to rain later, grab umbrella

Using `and`/`or` in code

- `and`/`or` are called binary infix operators
  - binary - two values in question
  - infix - placed between each value
- `and` is represented by `&&`
  - `goingToRain() && umbrellaIndoors()`
  - `musicTooQuiet() && !volumeAtMax()`
- `or` is represented by `||`
  - `rainingNow() || goingToRain()`

Order of Operations

- Just as in normal math, there's an order of operations

1. `()` - works from innermost to outermost
2. `!` - negation operators then evaluated
3. `&&` - AND operators are then evaluated
4. `||` - OR operators evaluated last

Today's Scenario

- Our Jeroo needs to clean up the island
- Need to fill in the `CleaningJeroo`'s `cleanUpTheIsland` method
  - How do we know we're done?
  - What's the opposite?
  - How do we make progress?