

Conditionals

Week 3 in Snap!

Predicates

- Report boolean values
 - Can only be either true or false
- Predicates are shaped like hexagons



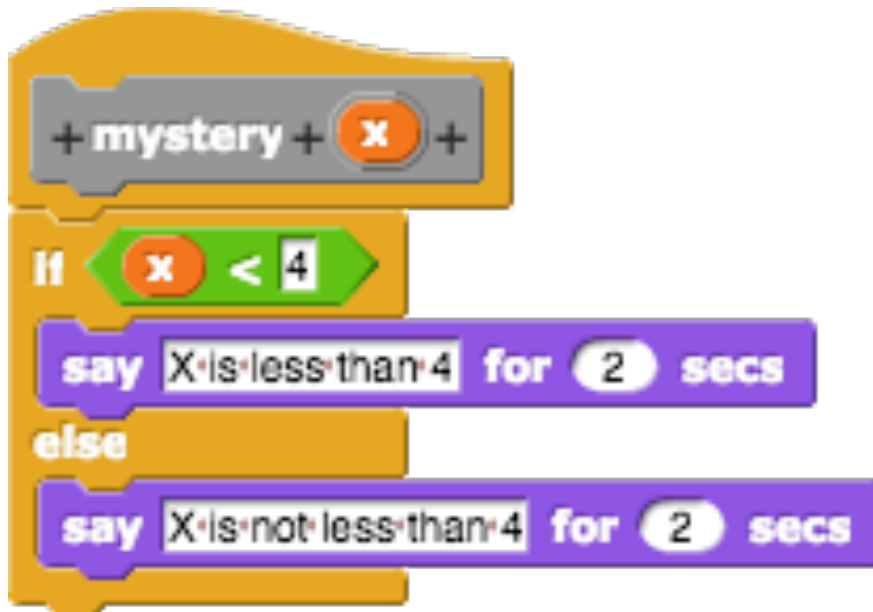
Reports true



Reports false

Predicates

- We use predicates as conditionals in if-else statements
 - “if” something is true, “then” do something
 - “else” do some other thing



Modulus

- Operation that reports only the remainder of a division operation

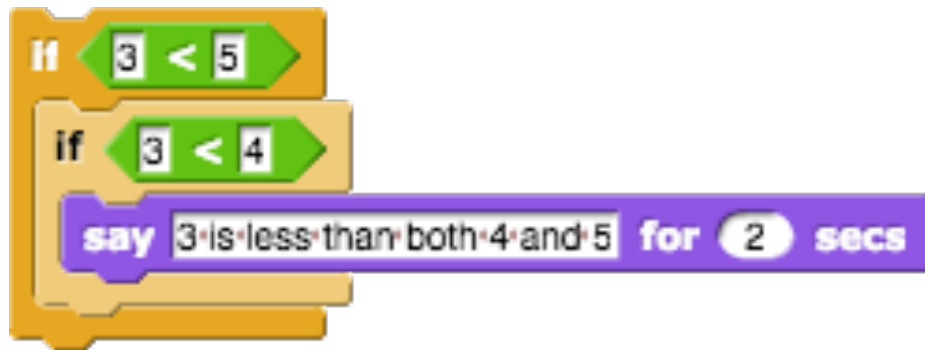
Reports 1  7 mod 3

Reports 4  10 mod 6

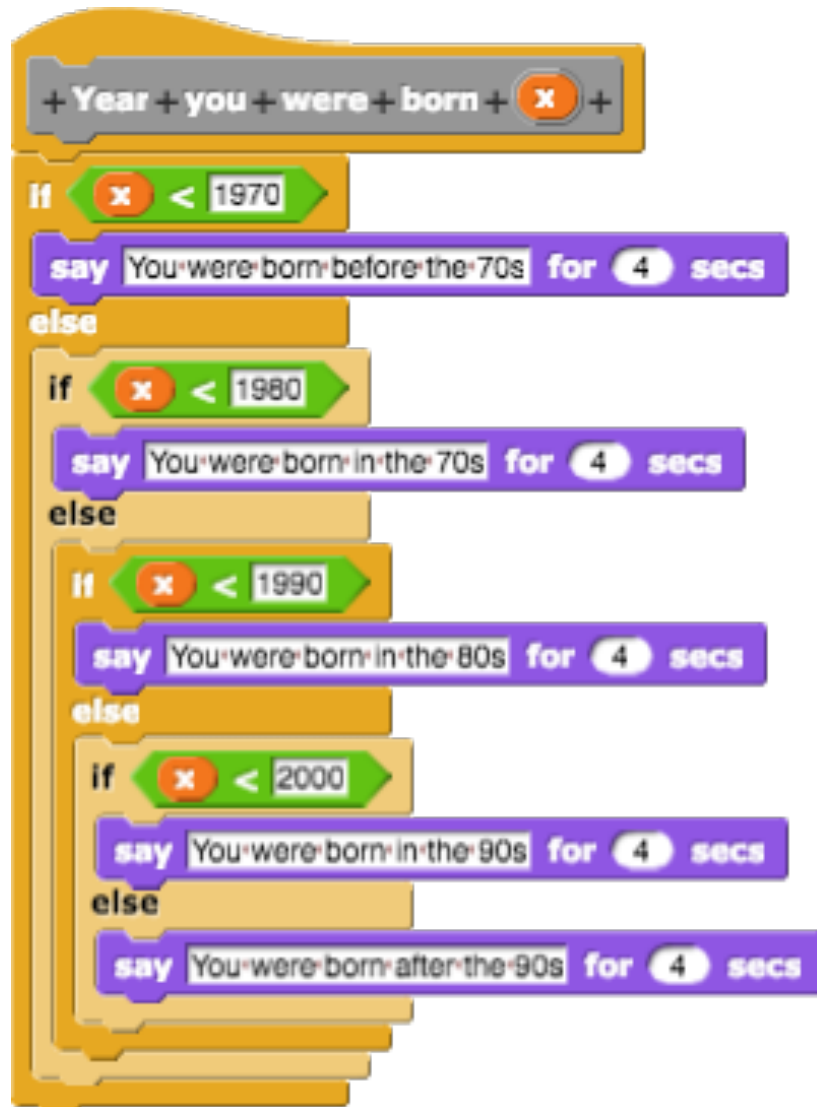
Reports 0  4 mod 2 because 4 is divisible by 2

Nested If-Else Statements

- If statements can go inside of if statements



Another Example



Year you were born 1987

You were born in the 80s

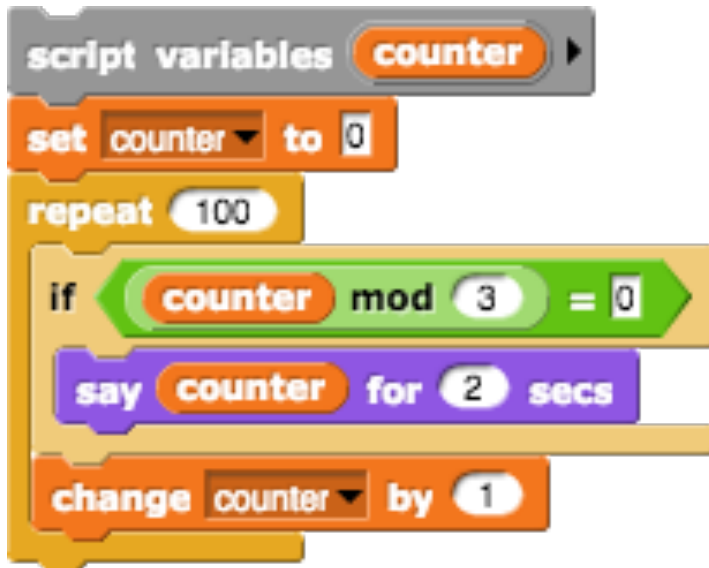
```
+ mystery + z +  
if (z mod 2 = 0)  
  say z is divisible by 2 for 2 secs  
else  
  if (z mod 3 = 0)  
    say z is divisible by 3 for 2 secs  
  else  
    if (z mod 4 = 0)  
      say z is divisible by 4 for 2 secs  
    else  
      say z is not divisible by 2, 3, or 4 for 2 secs
```

mystery 9

- A. “z is divisible by 2” is said
- B. “z is divisible by 3” is said
- C. “z is divisible by 4” is said
- D. “z is not divisible by 2, 3, or 4” is said

Script Variables

- A variable is something that holds a value
 - In the previous example, “z” was a variable
- Suppose you want to add a variable to your script without it being a parameter



this script says all multiples of 3 between 0 and 100

Another Example

```
go to x: 0 y: 0
clear
pen down
script variables sides
set sides to pick random 3 to 10
repeat sides
  move 30 steps
  turn 360 / sides degrees
```



Another Example

```
script variables name  
ask what's your name? and wait  
set name to answer  
say join Good morning name , have a great day for 2 secs
```

The image shows a Scratch script with four blocks. The first block is a grey 'script variables' block with a dropdown menu set to 'name'. The second block is a blue 'ask' block with the text 'what's your name?' and the 'and wait' option selected. The third block is an orange 'set' block with 'name' in the dropdown and 'answer' in the value field. The fourth block is a purple 'say' block with 'join' selected in the dropdown, 'Good morning' in the first text field, 'name' in the variable field, ', have a great day' in the second text field, and '2 secs' in the duration field.

Truth Tables - Recap

A	B	A and B
F	F	F
F	T	F
T	F	F
T	T	T

A	B	A or B
F	F	F
F	T	T
T	F	T
T	T	T

A	not A
F	T
T	F

Boolean Expressions

- A boolean value is either true or false
- What if we want to evaluate many boolean expressions?



“and” reports true if both predicates are true

“or” reports true if one or both predicates are true

“not” reports the opposite value of its predicate

More Examples



```
script variables x
set x to true
say x or not x
```

- A. True
- B. False
- C. Something else

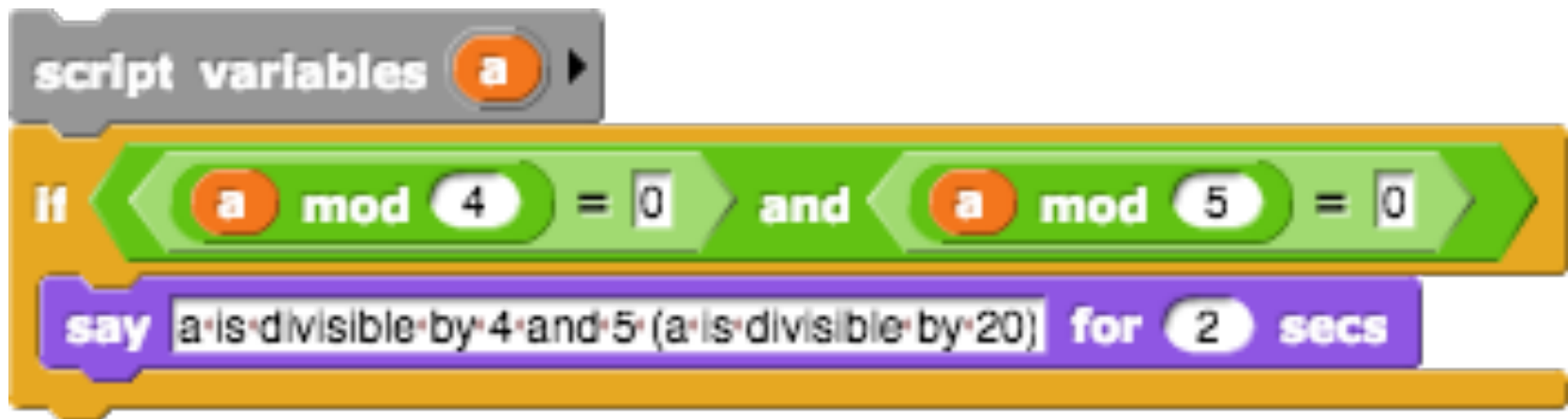


```
script variables x
set x to true
say x and not x
```

- A. True
- B. False
- C. Something else

Another Example

- This block says “a is divisible by 4 and 5 (a is divisible by 20)” if the condition is met



What does this script say?

The script consists of the following blocks:

- script variables** block containing two variables: `inCalifornia` and `isRaining`.
- set** block: `inCalifornia` to `true`.
- set** block: `isRaining` to `false`.
- say** block with the following logical expression:
`inCalifornia and isRaining or
inCalifornia or
isRaining and inCalifornia and not isRaining`

- A. true
- B. false
- C. inCalifornia

Custom Operators

- We may want a custom operator that reports a value, such as the square of 2 numbers



Lab 3 Tasks

- Traffic Signal block
- Letter Grade block
- State of Water block
- In Between block
- Greater Than/Equal block
- (You don't have to do weekend/weekday blocks)
- Number guessing game
 - 6 Challenges