

CS 160

CS Orientation

Expressions, Data Types, &
Input/Output

Assignment 3: Semantics vs. Syntax

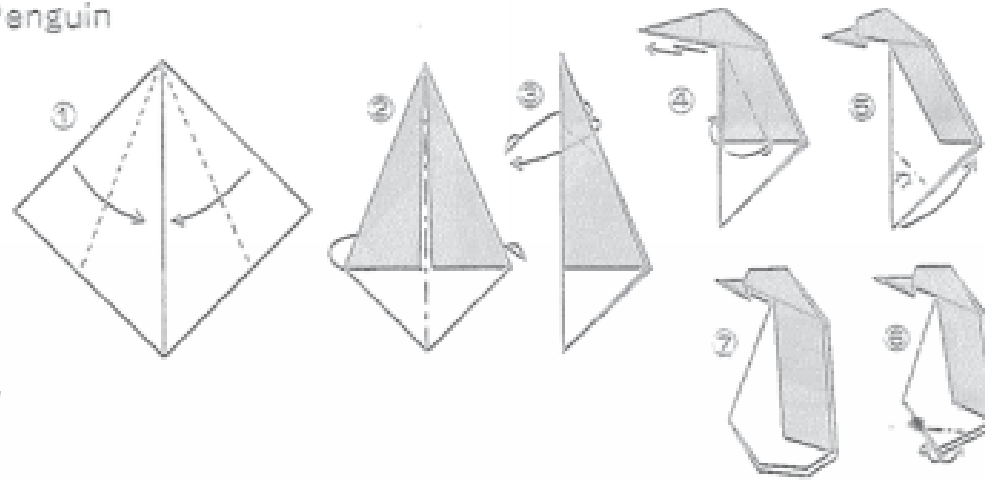
- What are these words?
- Why is this important?

meaning

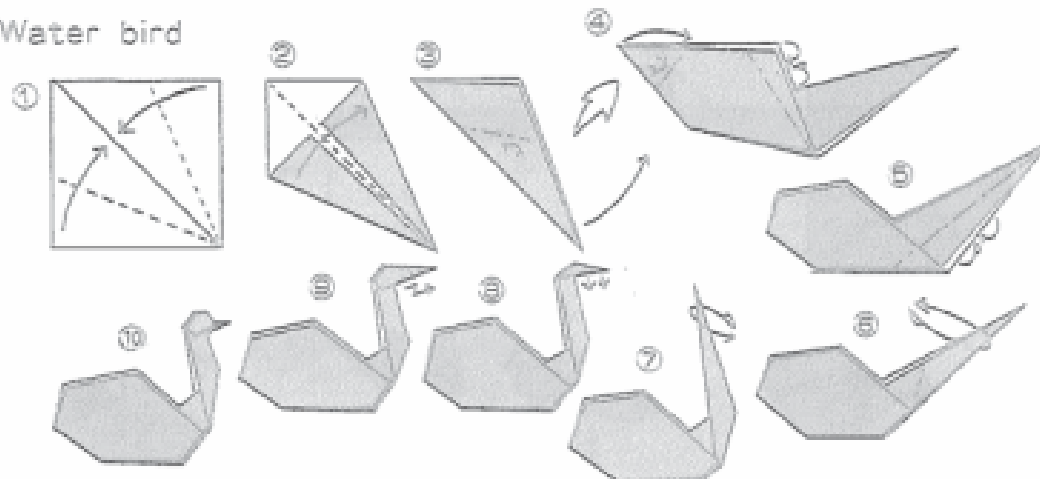
structure
punctuation
phrasing
allowed
words
lexicons

Syntax

Penguin

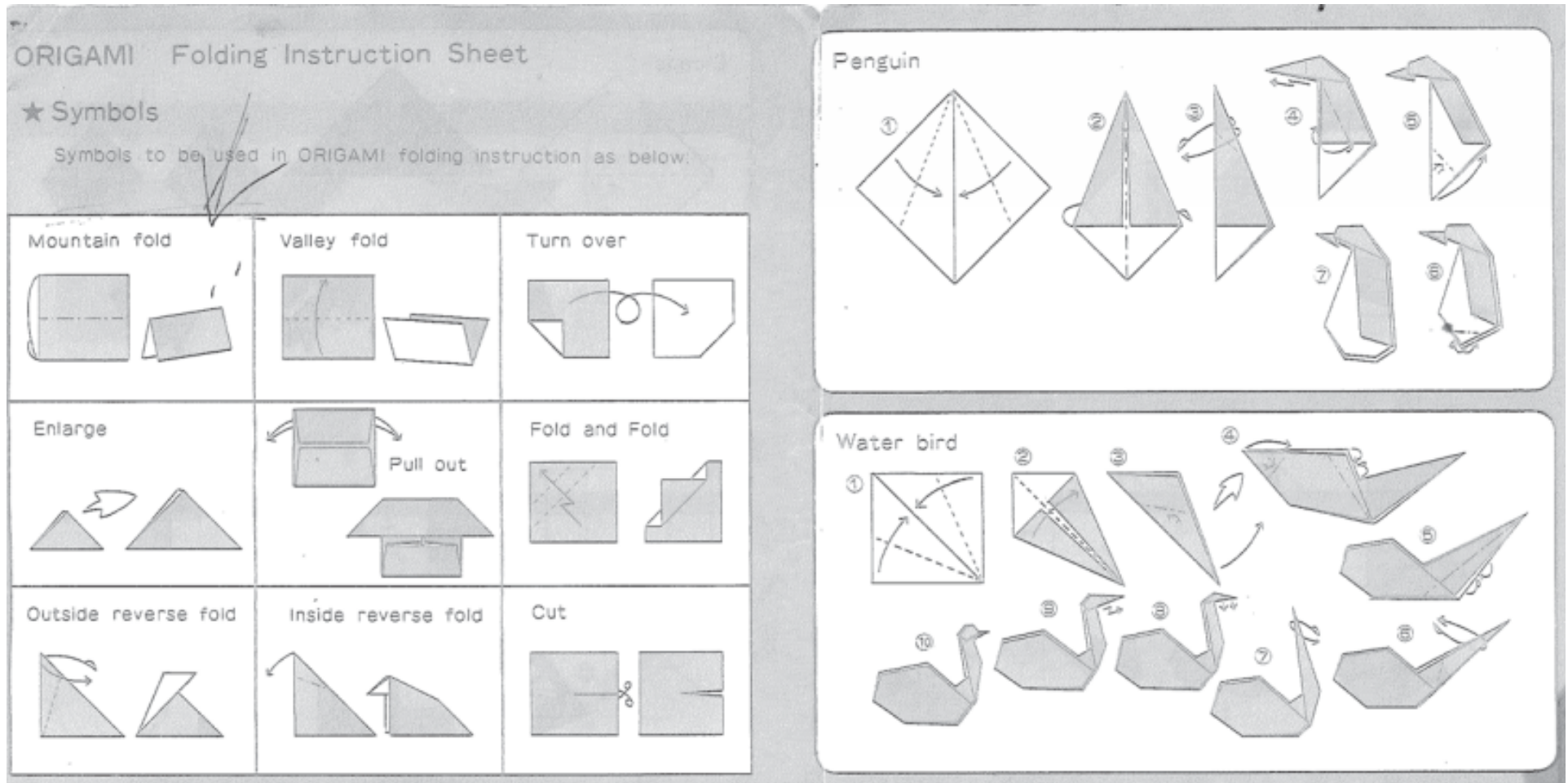


Water bird



Syntax and Semantics...

Which is more important?



What does this have to do with CS?

- How is this like CS programs?

Data Types/Converting

- string - "string of text"
- ~~x~~ character - 'a'
- integer - 79
- ~~x~~ boolean - True
- float - 79.0

user-defined

*false - 0
primitive*

```
2 boolean=True #booleans are always 0 for false or 1 for true
3 ch='a' #only strings in python with single or double quotes
4
5 print(num+boolean) #can add number and boolean
6 print(num+ord(ch)) #can add number and ascii value of character
7 print(chr(49)) #can find out character based on ascii value
8 print(bool(num)) #any number other than 0 is true
9 print(int(True)) #True is always 1
```

10

11

11,0-1

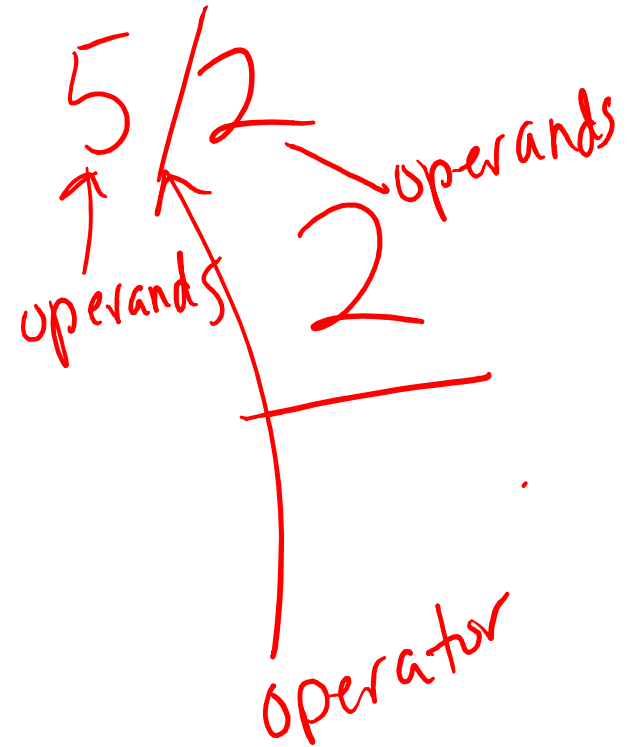
Bot

Python Operators and Their Computer Symbols

Python 2

- +
- -
- *
- /
- //
- %
- **

— integer division



Hierarchy of Operations

- Functions, i.e. `math.sqrt()`

- Power

- Mod

- Mult, Div

- Add, Sub

- Relational

- Logical

Python Examples

- $5 * 2 + 3 - 10$
(Handwritten red annotations: a triangle above the first three terms with '1' above the first, '2' above the second, and '3' above the third)
- $5 * (2 + 3) - 10$
(Handwritten red annotations: '2' below the first '2', '1' below the '+', and '3' below the '3')
- $5/2$ — 2.5
- $5//2$ — 2
(Handwritten red annotation: an arrow pointing to the double slash with the text 'python3' below it)

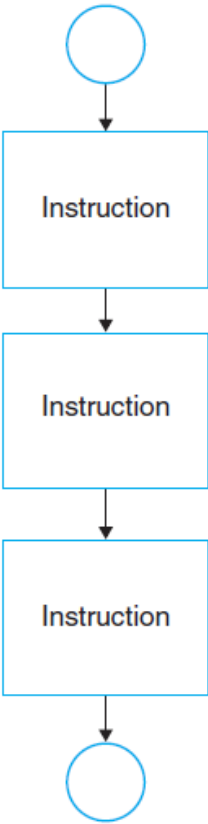
How about storing values?

- `ch = 'a'`
- `num = 79`
- `cont = True`
- `num = num + 1`
- Can we mix types?
 - `num = num + cont`
 - `num = num + ch`
 - `ch = ch + num`

Expressions and Equations

Expressions	Equations
$A + B$ <i>A</i> and <i>B</i> are numeric. The resultant is numeric and is not stored.	$C = A + B$ <i>C</i> , <i>A</i> , and <i>B</i> are numeric. The resultant is stored in <i>C</i> .
$A < B$ <i>A</i> and <i>B</i> are numeric, character, or string. The resultant is logical and is not stored.	$C = A < B$ <i>A</i> and <i>B</i> are numeric, character, or string. The resultant is stored in <i>C</i> ; <i>C</i> is logical.
$A \text{ OR } B$ <i>A</i> and <i>B</i> are logical. The resultant is logical and is not stored.	$C = A \text{ OR } B$ <i>C</i> , <i>A</i> , and <i>B</i> are logical. The resultant is stored in <i>C</i> .

Sequential Logic Structure

Algorithm	Flowchart	Pseudocode
<p>⋮</p> <p>5. Instruction</p> <p>6. Instruction</p> <p>7. Instruction</p> <p>8. ⋮</p>	 <pre>graph TD; Start(()) --> I1[Instruction]; I1 --> I2[Instruction]; I2 --> I3[Instruction]; I3 --> End(())</pre>	<p>⋮</p> <p>Instruction</p> <p>Instruction</p> <p>Instruction</p> <p>⋮</p>

Python Sequential Logic

```
print(" * ")  
print(" *** ")  
print(" ***** ")  
print("*****")
```

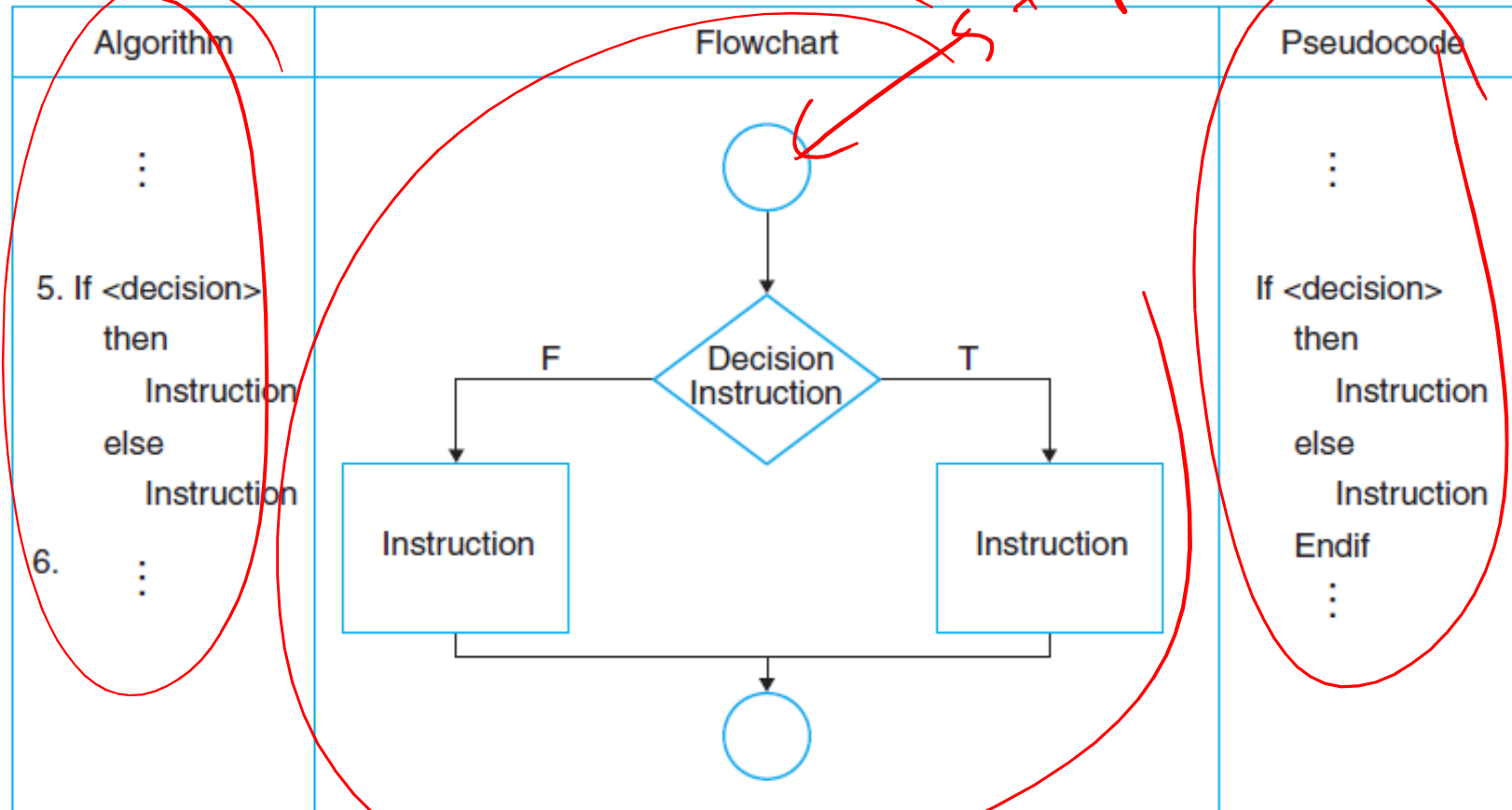
```
2 boolean=True #booleans are always 0 for false or 1 for true
3 ch='a' #only strings in python with single or double quotes
4
5 print(num+boolean) #can add number and boolean
6 print(num+ord(ch)) #can add number and ascii value of character
7 print(chr(49)) #can find out character based on ascii value
8 print(bool(num)) #any number other than 0 is true
9 print(int(True))
10
11 #can't use a variable without assigning a value/defining first
12 #sequence and order matters!!!
13 print(num+num2)
14 num2 = 30
```

-- INSERT --

12,31

Bot

Decision Logic Structure



Relational Operators and Symbols

- >
- >=
- <
- <=
- ==
- !=

all are
binary

2 operands