

Module 2

Bool

String

Function

Collection

Control Flow

Announcements

- Course Syllabus
- Transition to University: Take initiatives!
- Follow the course policies (e.g., the contact policy)
- Minor correction to the competency-based grading
- Note taking and reflection sharing

Announcements

- Labs
 - Do not take them solely as programming exercises
 - Imagine that the requirements are from your customers/project manager
 - E.g., The fruit price is set by a grocery store who will use your system and you cannot change them to random numbers.
 - So you need to read the requirements carefully
 - The code will be maintained within a group of soft engineers
 - E.g., Your input, output, and function definition must be consistent as the contract
 - Practice problem solving skills

Announcements

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 - Unfortunately, still no TAs for today. Please put all questions here and I'll go back and forth between the two labs:
<https://docs.google.com/document/d/1Bsq6oC6cu-lQP06imqVSnsPlqdKSmgaiDhG1BFO2Zvo/edit?usp=sharing> (same link as last week. Link also available on lab handout)
 - Because of this, I do not take questions right after class. I'll take whatever questions you have afterwards in the lab.

Outline

- Bool
- String
- Function
- Collection
- Control Flow

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Bool: Comparison Operator

```
>>> 1 < 2
True
>>> 1 > 2
False
>>> 1 == 1
True
>>> 3 >= 4
False
>>> 3 <= 4
True
>>> 3 != 4
True
>>> 2 != 2
False
```

<u>Comparison Operator</u>	<u>Symbol</u>
less than:	<
greater than:	>
equal to:	==
greater than or equal to:	>=
less than or equal to:	<=
not equal to:	!=

String: Concatenation and Repetition

```
"Hello" + "World"
```

```
"Hello" + " " + "World"
```

```
"Hello" + " World"
```

```
"Hello " + "World"
```

```
'a' * 3
```

```
"Python" * 4
```


String: in and len()

```
"bc" in "abcde"  
"bd" in "abcde"  
'f' in 'abcde'
```

```
len("Hello World")
```

Indexing

- Goal: get a substring
 - Only one character

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	e	a	r	n		t	o		P	r	o	g	r	a	m
-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

- Index surrounded with square brackets

```
>>> a = "Learn to Program"
>>> a[4]
'n'
>>> a[-12]
'n'
```

Slicing

- Goal: get a substring
 - Multiple characters

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	e	a	r	n		t	o		P	r	o	g	r	a	m
-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

- Use colon “:”. [start index (included) : end index (excluded)]

```
>>> a = "Learn to Program"
>>> a[4:13]
'n to Prog'
>>> a[4:-4]
'n to Pro'
```



Exercise

- Worksheet Q1: bool – comparison operator
- Worksheet Q2: string – concatenation and repetition
- Worksheet Q3: string – in and len()
- Worksheet Q4: string – Indexing and slicing

Worksheet link for today:



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Design Recipe

- A roadmap for defining functions
- Usually create the design recipe before writing a function
- Requirement
 - You should include the design recipe in your labs for all functions to form a good coding style/habit
 - Even with the docstring, it is still good to comment your code for readability

More info (optional):

- UTM CSC108 PCRS <https://mcs.utm.utoronto.ca/~pcrs/python-programming/index.shtml>
 - Week 2 -> Prepare -> Function Design Recipe
- More examples: https://mcs.utm.utoronto.ca/~108s21/handouts/design_recipe.pdf



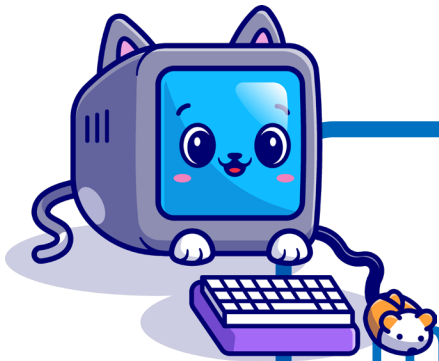
Function



- Worksheet Q5: Write a simple function

Function

- How to use debugger
- How to run the tests



DEMO:

module2_cssd1101_demo_function.py

Outline

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List

- Declaration
- Indexing and Slicing
- in and len()
- Add an element to list

Dictionary

- Declaration
- Accessing an item
- in and len()
- Adding an element
- Updating an item

Exercise



- Worksheet Q6: list – define a list
- Worksheet Q7: list – indexing
- Worksheet Q8: list – slicing
- Worksheet Q9: list – in
- Worksheet Q10: list – len()
- Worksheet Q11: list – add an element to a list
- Worksheet Q12: dictionary – define a dictionary
- Worksheet Q13: dictionary – accessing an item
- Worksheet Q14: dictionary – in
- Worksheet Q15: dictionary – len()
- Worksheet Q16: dictionary – adding an element
- Worksheet Q17: dictionary – updating an item

Outline

- Bool
- String
- Function
- Collection
- **Control Flow**

Control Flow

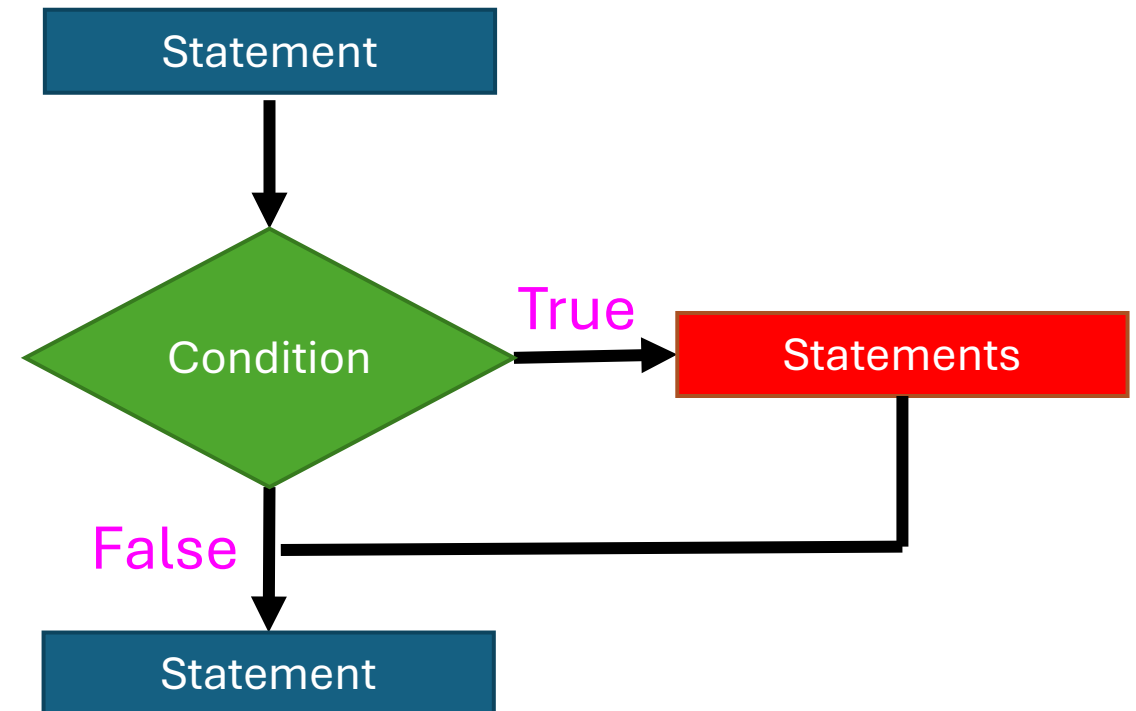
- If-statement
 - Motivation
 - Basic Syntax
 - Variations
- loop

If-statement Syntax

statement

```
if Boolean-expression:  
    statement  
    statement
```

statement



if-else

statement

```
if Boolean-expression:
```

```
    statement
```

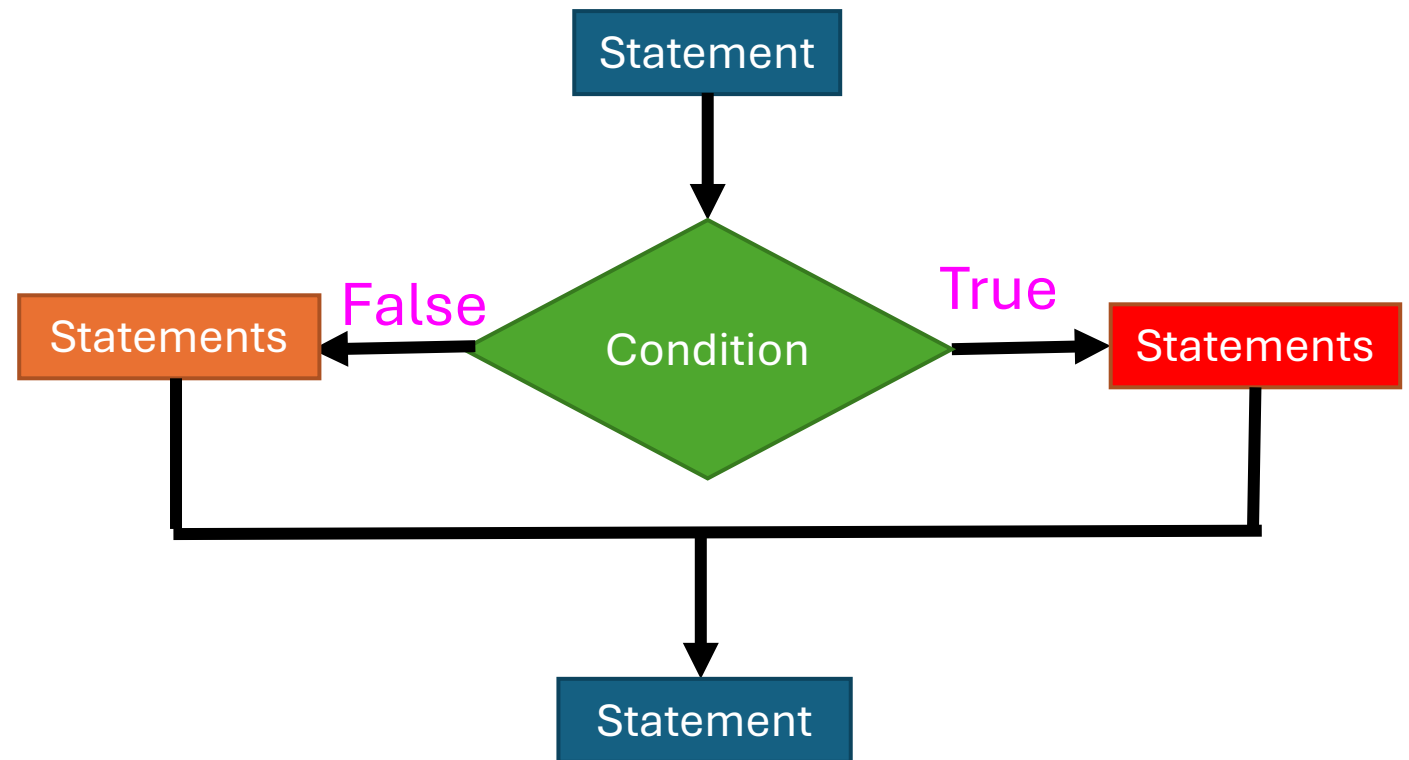
```
    statement
```

```
else:
```

```
    statement
```

```
    statement
```

statement

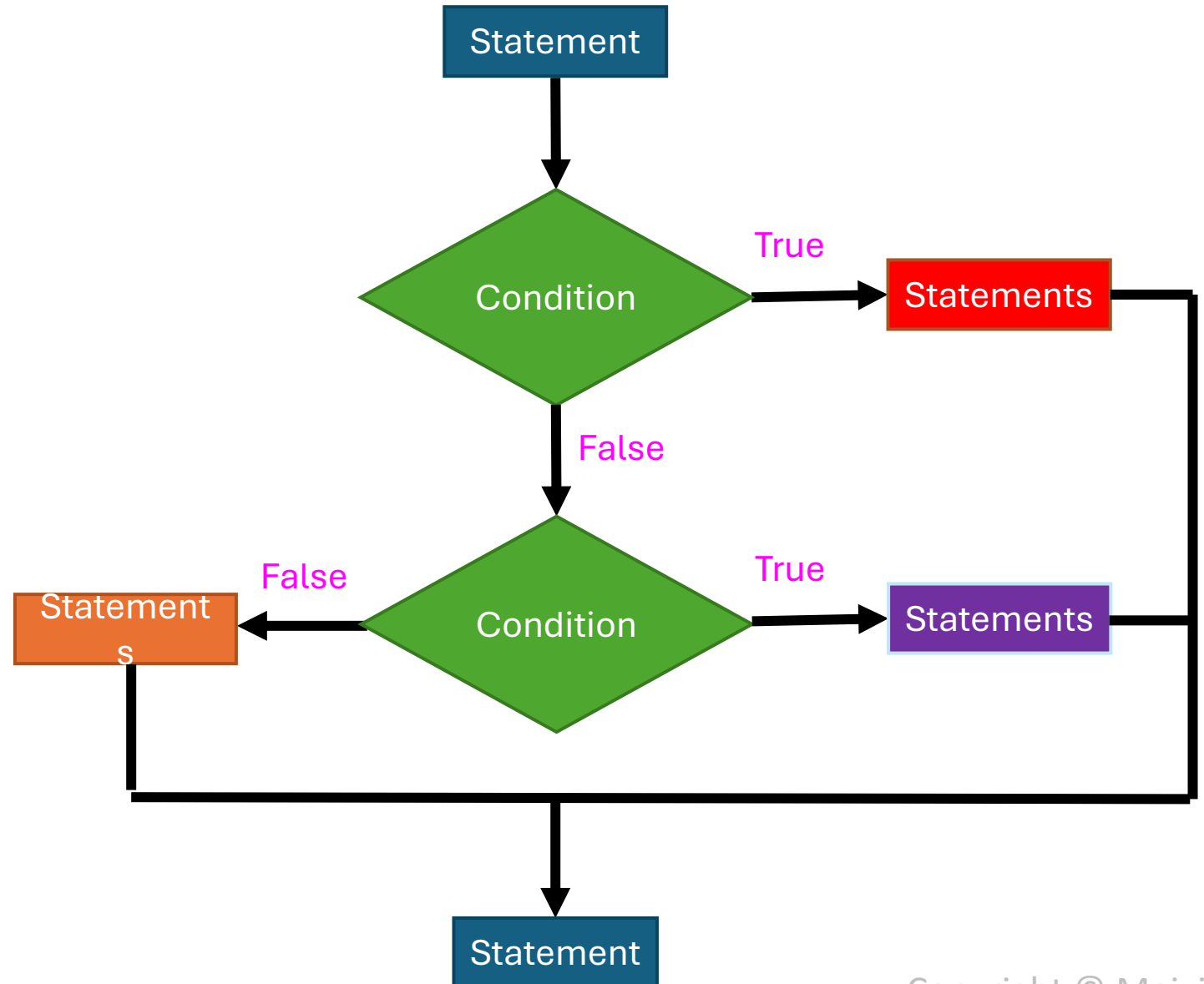


if-elif-else

statement

```
if Boolean-expression:  
    statement  
    statement  
elif Boolean-expression:  
    statement  
    statement  
else:  
    statement  
    statement
```

statement



Exercise



- Worksheet Q18: if
- Worksheet Q19: if-else
- Worksheet Q20: if-elif-else

Control Flow

- If-statement
- loop
 - Motivation
 - for-loop
 - for-loop with range()
 - Loop over string
 - Loop over list
 - Loop over dictionary
 - while-loop

Exercise



- Worksheet Q21: range()
- Worksheet Q22: loop over string
- Worksheet Q23: loop over list
- Worksheet Q24: loop over dictionary

Iterable Data Type

- The ones that you can loop over (i.e., iterable)
 - **string**
 - **list**
 - **dictionary**

There are other iterable data types as well

Questions about the test?

- Link to the test: <https://ca.prairietest.com/>

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