



Certified Python Programmer - PCEP

Montgomery College

Workforce Development & Continuing Education

Information Technology Institute

Lesson 2

Programming Fundamentals

Lesson Objectives

Review

Structured Theorem

Boolean Expression

Flowchart

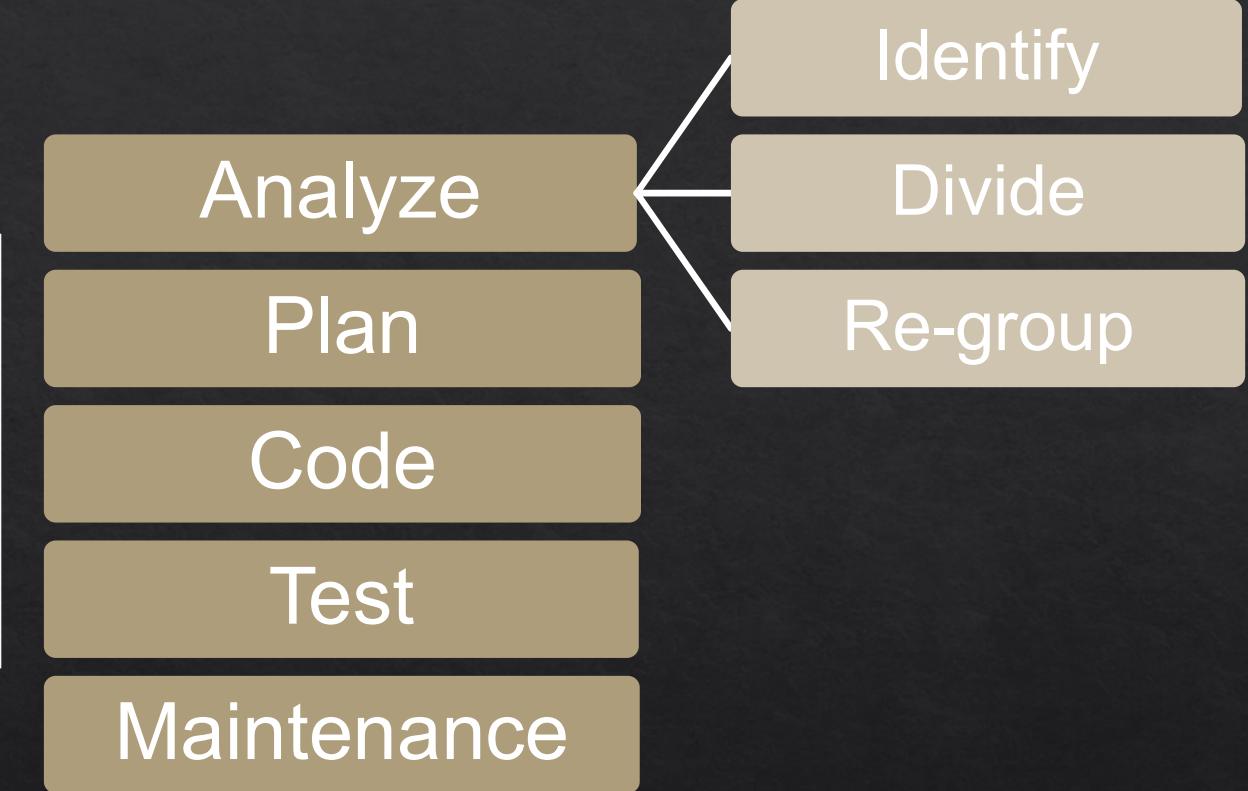
Pseudocode

Functions

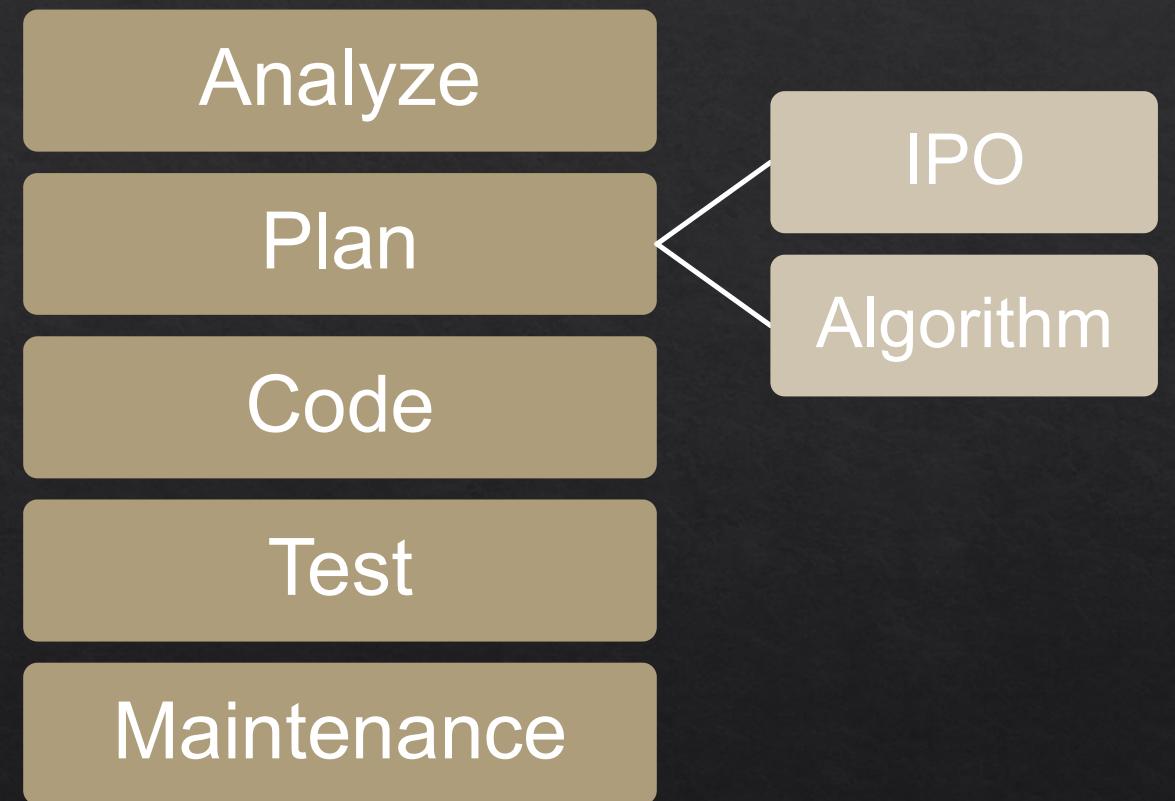


Review

Program Cycle



Program Cycle



Input

inches

Process

in X 2.54 cm/in

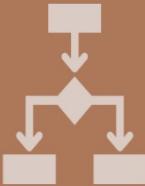
Output

cm

Process



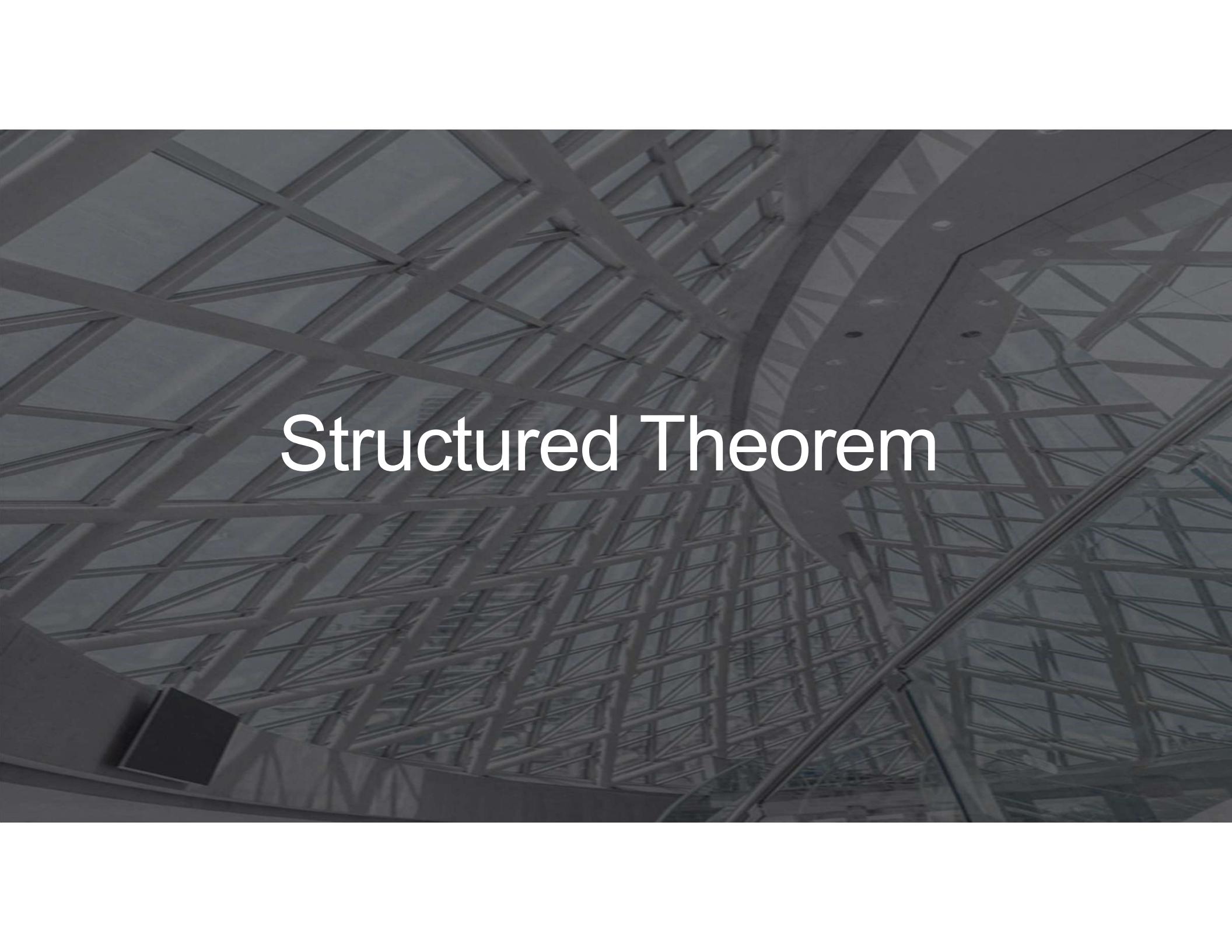
Formula



Flowchart



Pseudocode

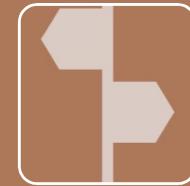
The background of the slide features a dark, abstract image of a modern architectural structure, likely a dome or a large hall, characterized by a complex network of intersecting metallic beams and glass panels that create a geometric, almost crystalline pattern.

Structured Theorem

Structured Theorem



Sequence



Selection



Repetition

Sequence of Statements

A. Lightly grease hot skillet with oil or butter

B. Crack egg into skillet

C. Preheat skillet over medium heat

D. Remove from skillet and season with salt & pepper

E. Cook until egg white is completely set

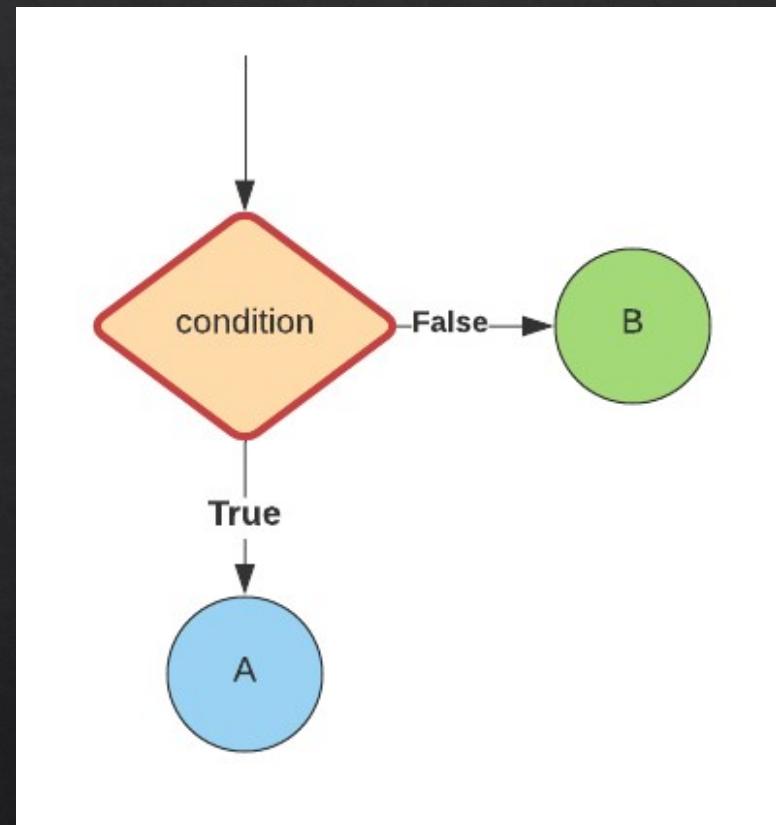
Sequence of Statements

- C. Preheat skillet over medium heat
- A. Lightly grease hot skillet with oil or butter
- B. Crack egg into skillet
- E. Cook until egg white is completely set
- D. Remove from skillet and season with salt & pepper

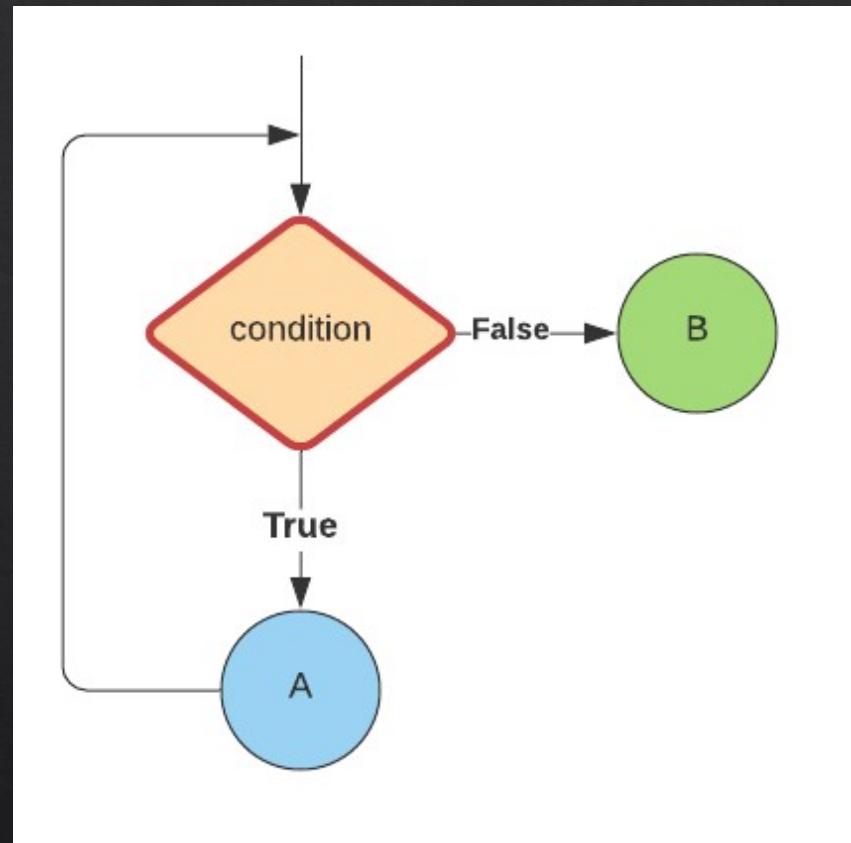
Selection Statement



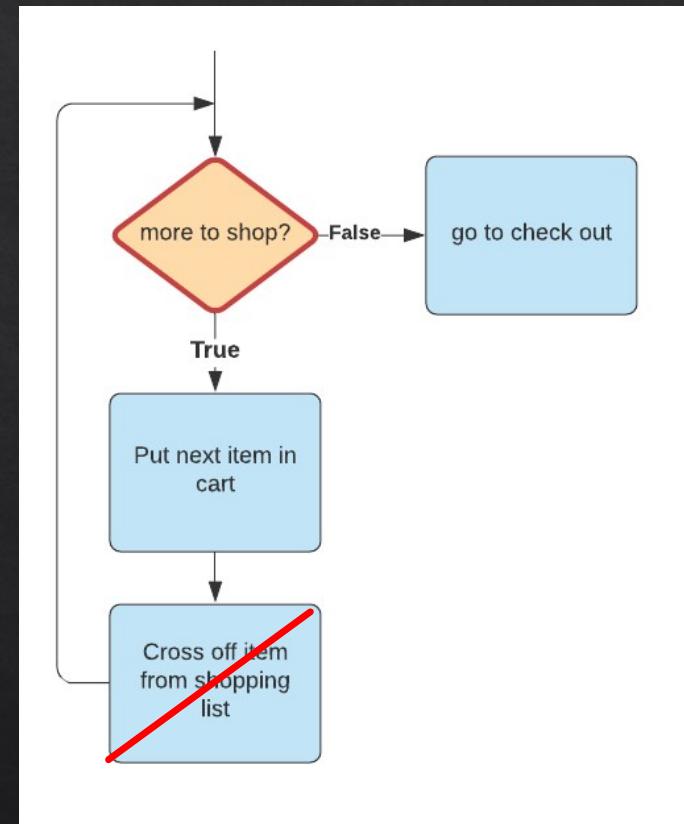
Selection Statement



Repetition Statement



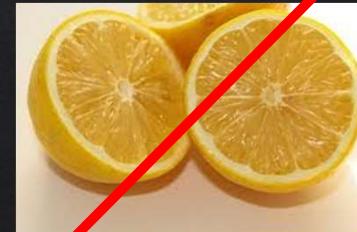
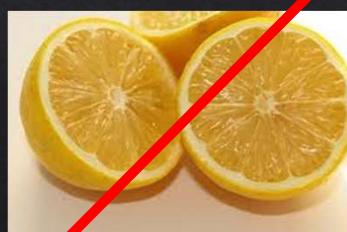
Repetition Statement



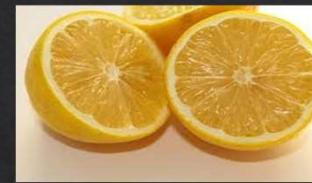
The background of the slide is a dark, grainy photograph of a forest path. The path is covered in fallen leaves and branches, leading through a dense thicket of bare trees. The lighting is low, creating a somber and mysterious atmosphere.

Boolean Expression

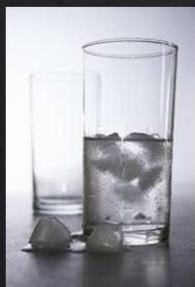
ice water AND lemon



Boolean Table: AND



AND	True	False
True	True	False
False	False	False



coffee OR tea



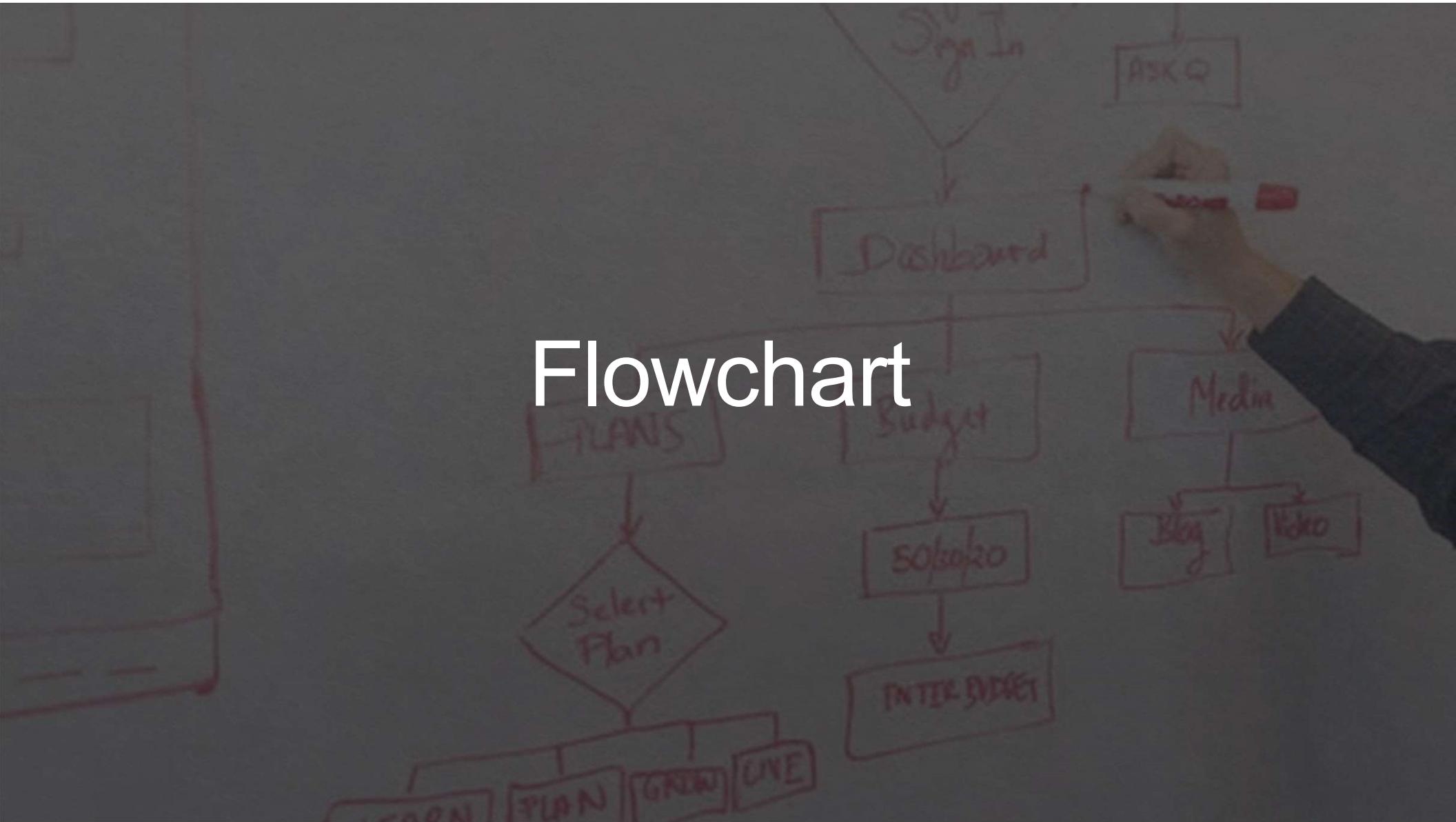
Boolean Table: OR



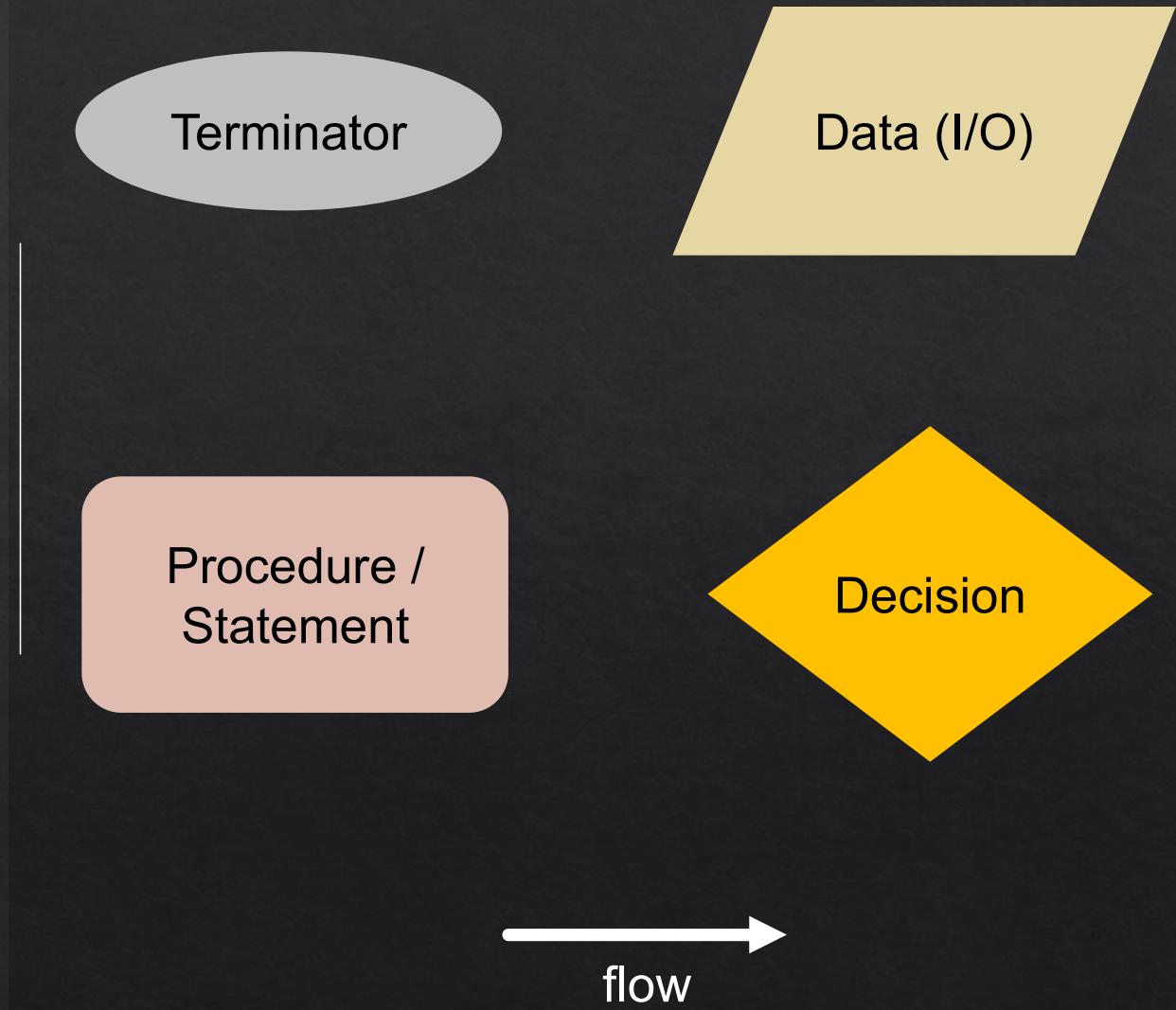
OR	True	False
True	True	True
False	True	False



Flowchart



Flowchart





Classwork

Print multiplication table for 3.

1. Identify IPO
2. Draw a flow-chart for the process (use <https://app.diagrams.net/>)

Exercise: Print Multiplication Table for 3 (IPO)

Input

none

Process

Output

3

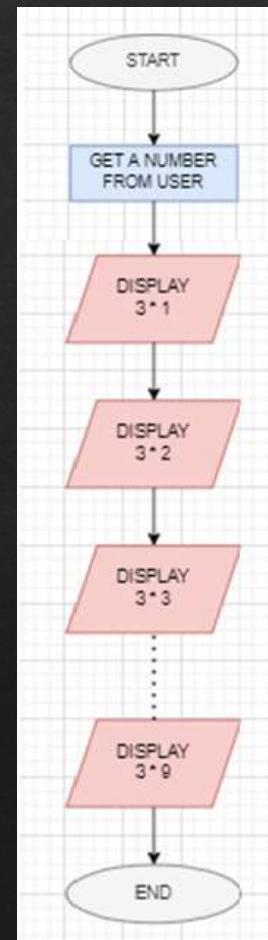
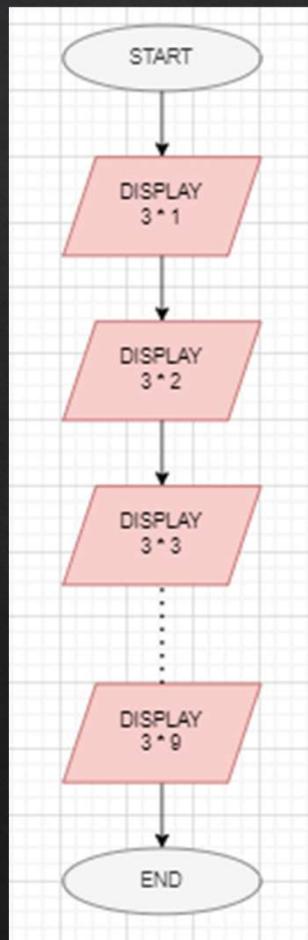
6

9

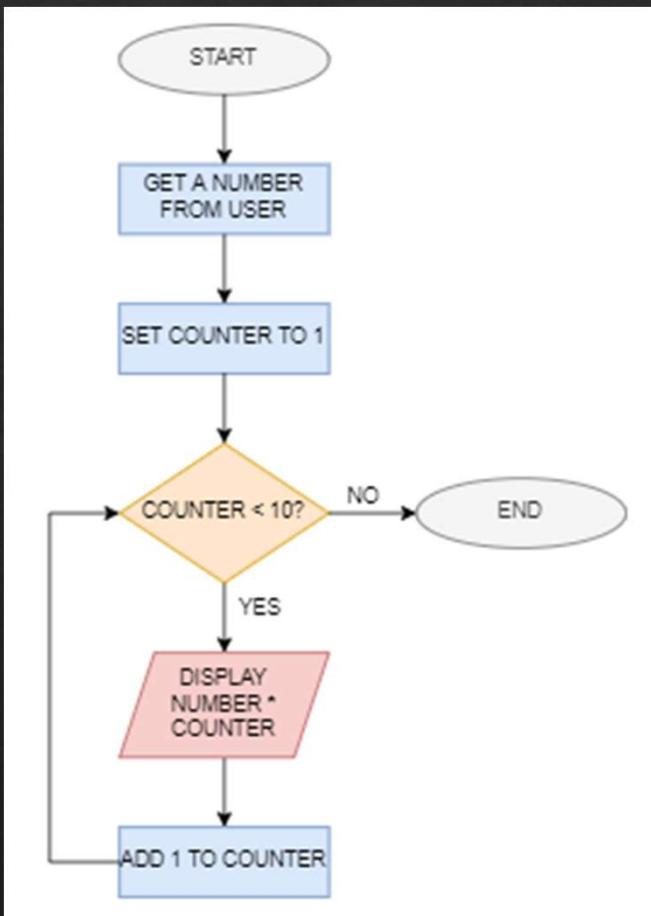
...

27

Exercise: Print Multiplication Table for 3 (flowchart 1)



Exercise: Print Multiplication Table for 3 (flowchart 2)



Test Data

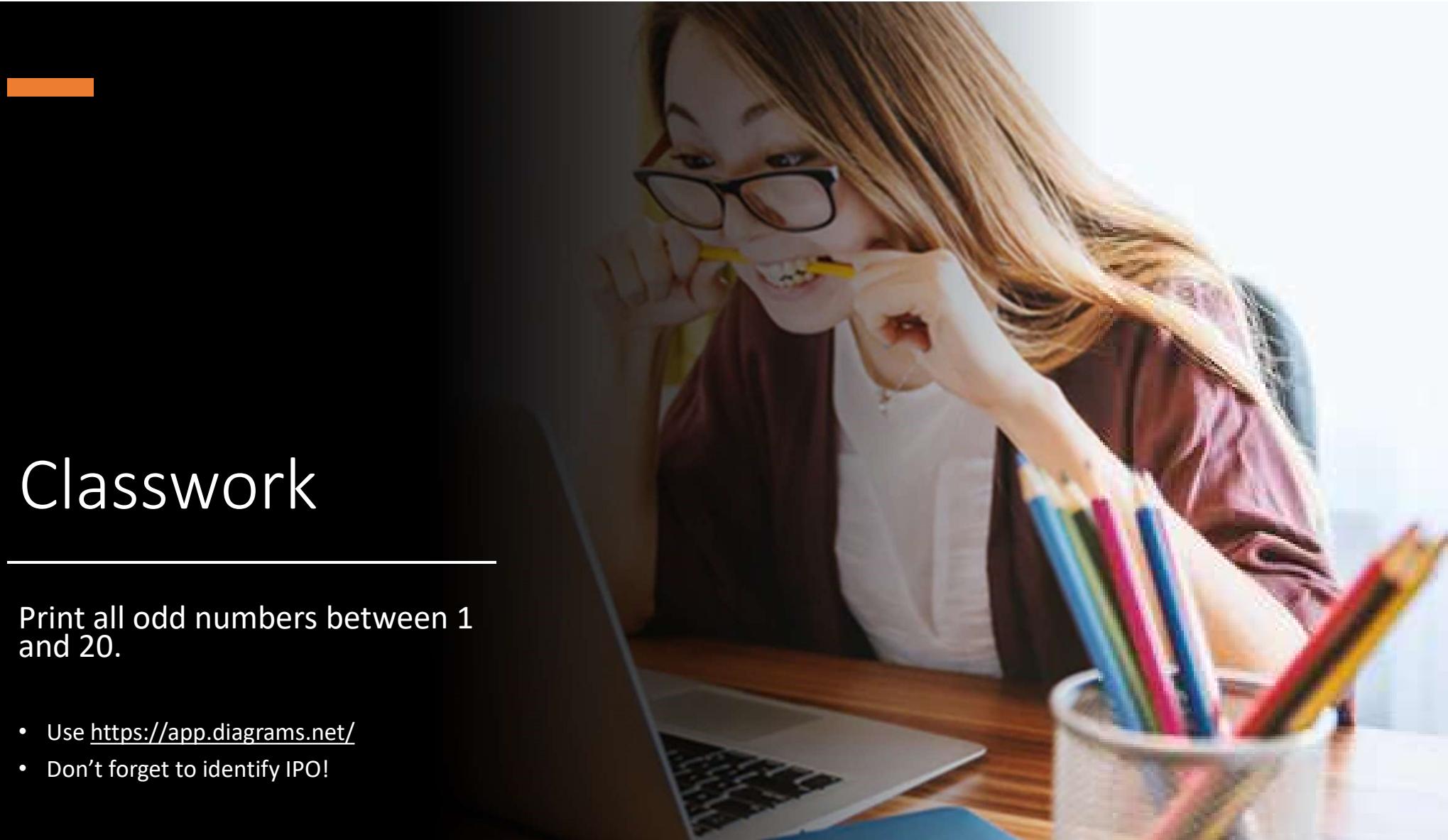
A number from the user: 3

counter	counter < 10 ?	output	New counter
1	True	3	2
2	True	6	3
3	True	9	4
...			9
...			9
9	True	27	10
10	False	stop	

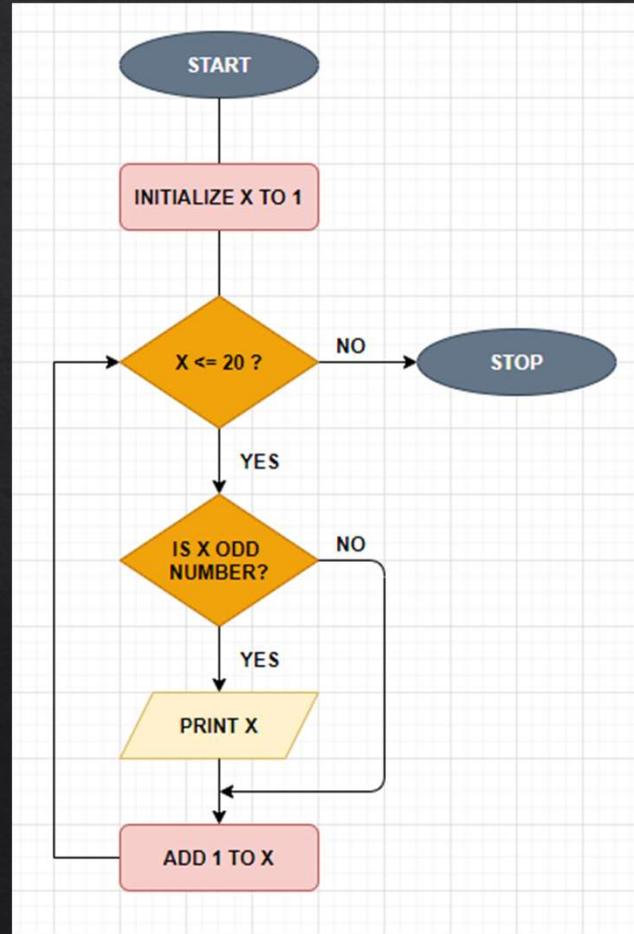
Classwork

Print all odd numbers between 1 and 20.

- Use <https://app.diagrams.net/>
- Don't forget to identify IPO!



Exercise: Print all odd numbers between 1 and 20.



Break

Take a 5-minute break



Pseudocode



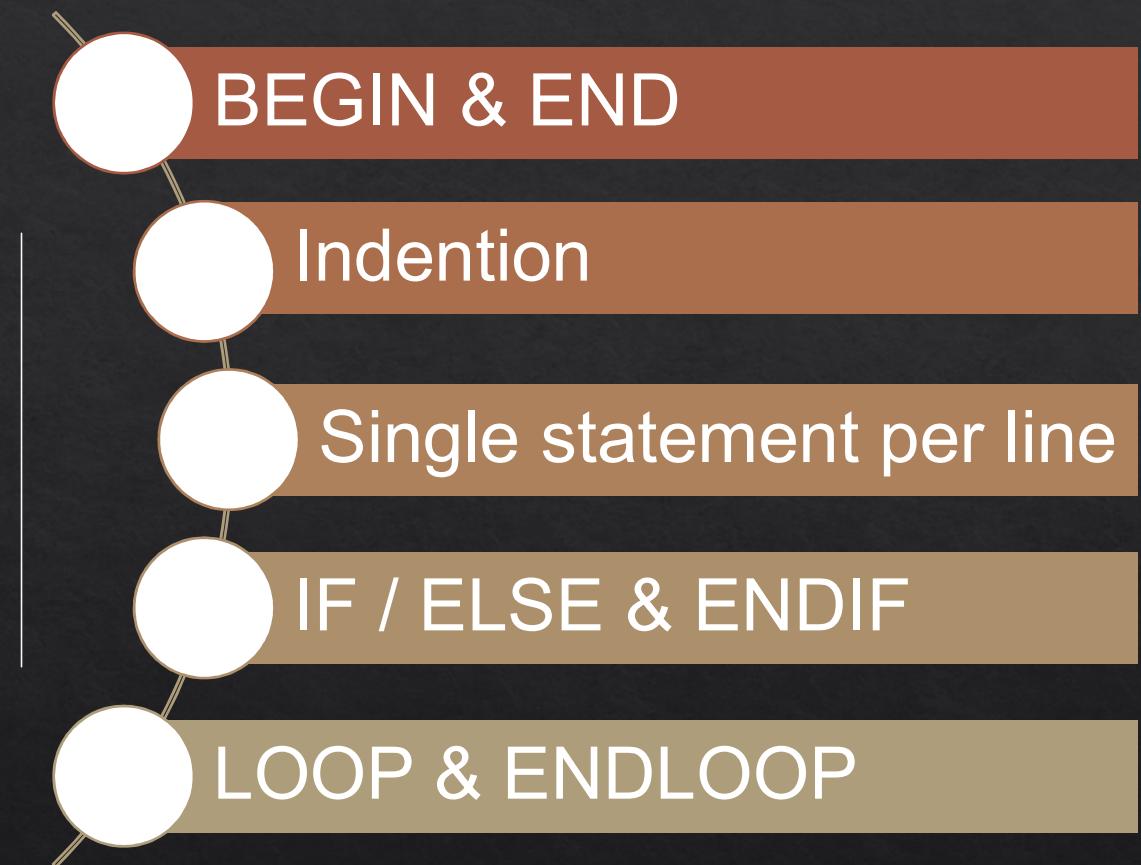
Pseudocode

Clear, Readable Text

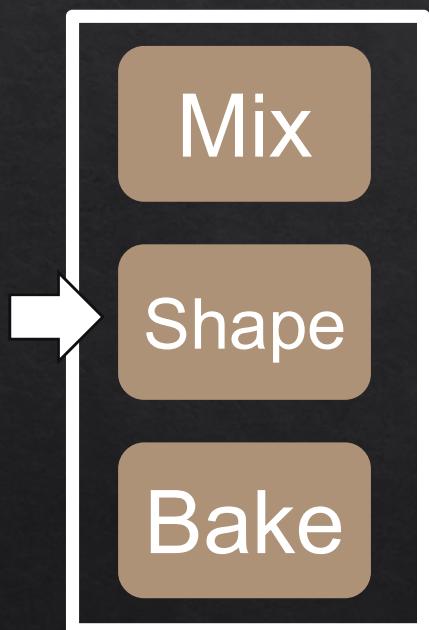
Step by Step Instruction

Used to Write Code

Pseudocode



Example: Pseudocode for Cookie Shape Process



INPUT: refrigerated cookie dough

PROCESS:

BEGIN

 preheat oven to 350 degrees

 grease baking sheet

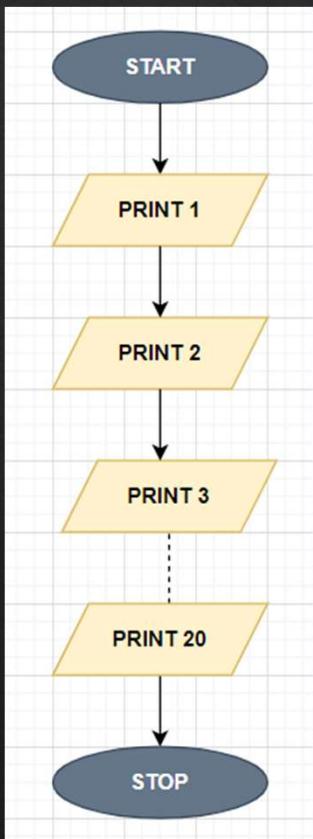
 roll cookie dough into walnut sized balls

 place rolled cookie dough 2 inches apart onto the prepared sheet

END

OUTPUT: rolled cookies on baking sheet

Example 1: Pseudocode for Print 1 to 20



BEGIN

PRINT 1

PRINT 2

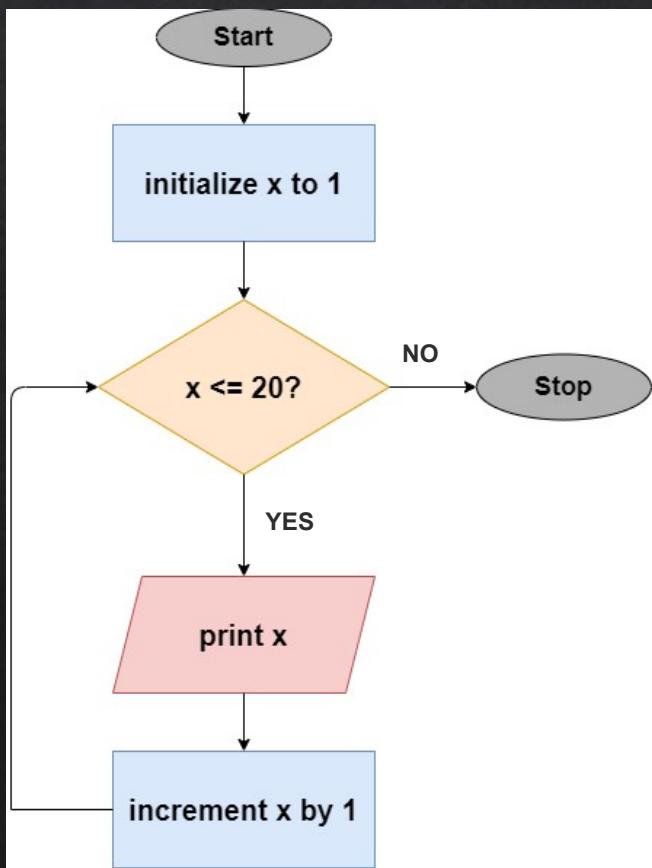
PRINT 3

...

PRINT 20

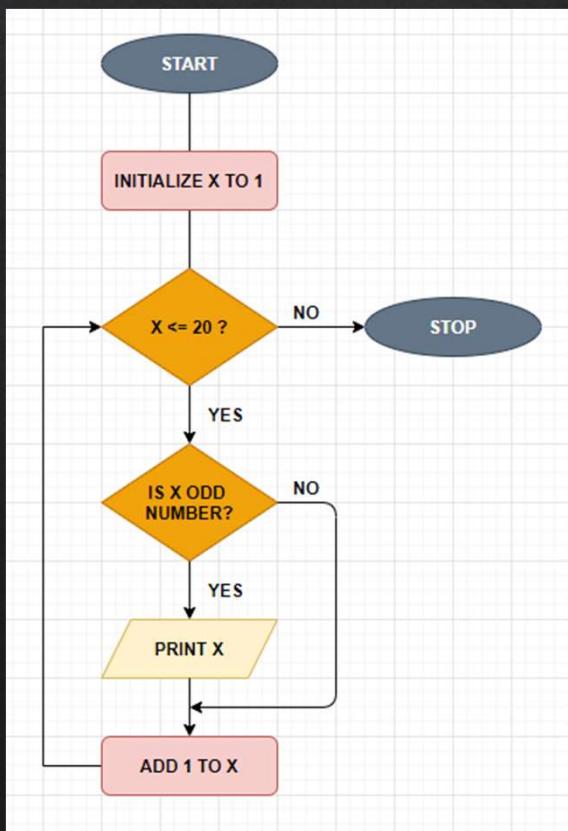
END

Example 2: Pseudocode for Print 1 to 20



BEGIN
SET X TO 1
LOOP X <= 20
PRINT X
INCREMENT X BY 1
ENDLOOP
END

Example 3: Pseudocode for Print all odd numbers between 1 and 20



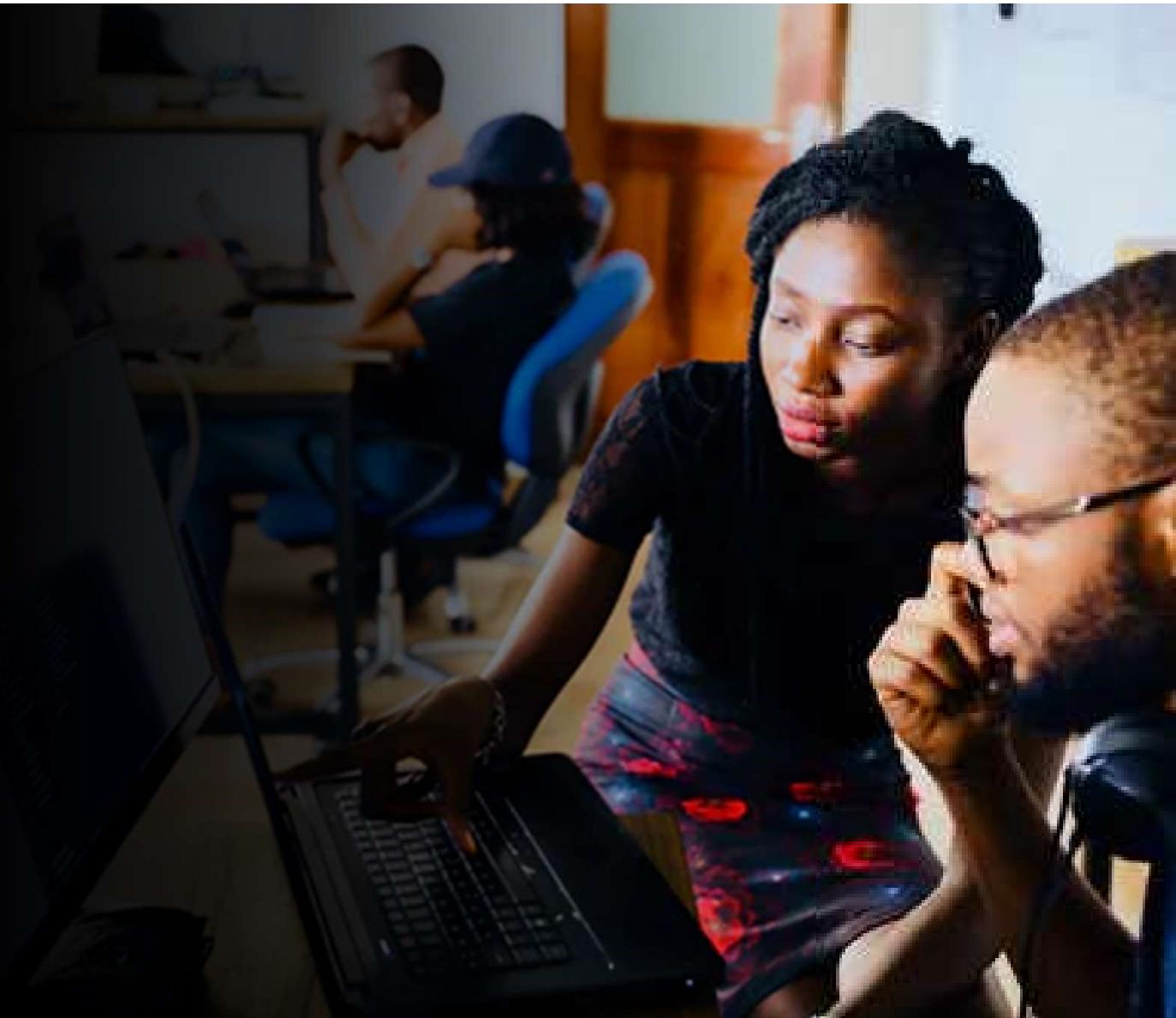
```
BEGIN
    X = 1
    LOOP X <= 20
        IF x is odd number
            PRINT X
        ENDIF
        X = X + 1
    ENDLOOP
END
```

Classwork

Write a pseudocode to

Get 5 numbers from a user and print
their average

Don't forget to identify IPO.



Get 5 numbers from a user and print their average (IPO)

Input

5 numbers

Process

Output

Average of
5 numbers

Get 5 numbers from a user and print their average

BEGIN

PROMPT USER FOR A NUMBER 1

GET NUMB1

PROMPT USER FOR A NUMBER 2

GET NUMB2

PROMPT USER FOR A NUMBER 3

GET NUMB3

PROMPT USER FOR A NUMBER 4

GET NUMB4

PROMPT USER FOR A NUMBER 5

GET NUMB5

AVERAGE = (NUMB1 + NUMB2 + NUMB3 + NUMB 4 + NUMB5) / 5

PRINT AVERAGE

END

Get 5 numbers from a user and print their average

BEGIN

SET COUNTER TO 1

SET TOTAL TO 0

LOOP COUNTER <= 5

PROMPT USER FOR A NUMBER

GET NUMBER

ADD NUMBER TO TOTAL

ADD 1 TO COUNTER

ENDLOOP

AVERAGE = DIVIDE TOTAL BY 5

PRINT AVERAGE

END

Flowchart vs Pseudocode

Flowchart

- Graphical Representation
- Non-Technical

Pseudocode

- Human Readable Text
- Convert to Code

Flowchart
vs
Pseudocode

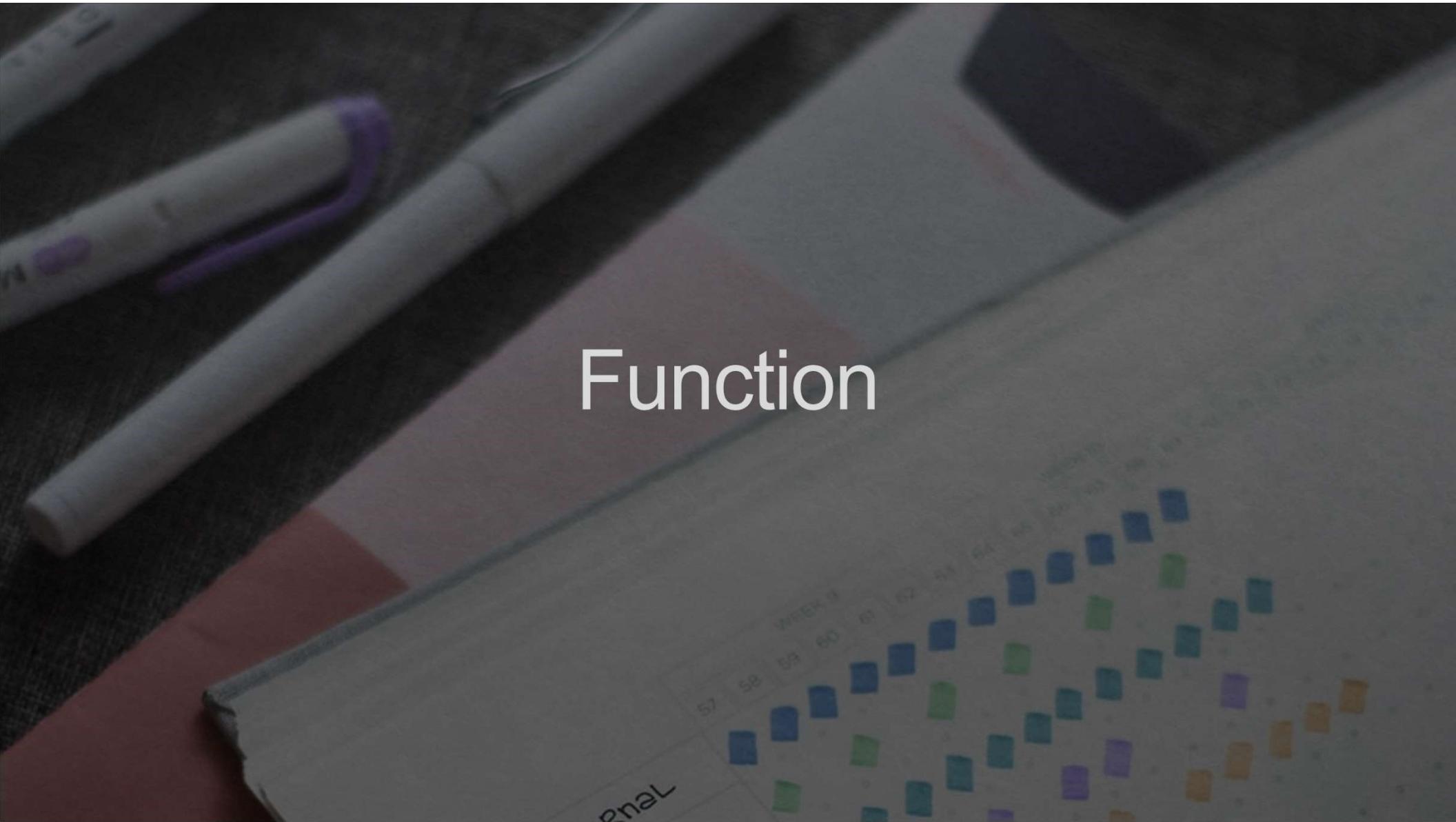
Flowchart



Pseudocode



Function



Function

Action

Performs a specific task

Pre-defined or Customized

Example

```
IF month is 1
    set month_value to "January"
ELSE IF month is 2
    set month_value to "February"
ELSE IF month is 3
    set month_value to "March"
ELSE IF month is 4
    set month_value to "April"
ELSE IF month is 5
    set month_value to "May"
ELSE IF month is 6
    set month_value to "June"
ELSE IF month is 7
    set month_value to "July"
```

```
ELSE IF month is 8
    set month_value to "August"
ELSE IF month is 9
    set month_value to "September"
ELSE IF month is 10
    set month_value to "October"
ELSE IF month is 11
    set month_value to "November"
ELSE IF month is 12
    set month_value to "December"
ELSE
    set month_value to "Unknown"
```

Convert
Month

Function

Organization

Reusability

Testing

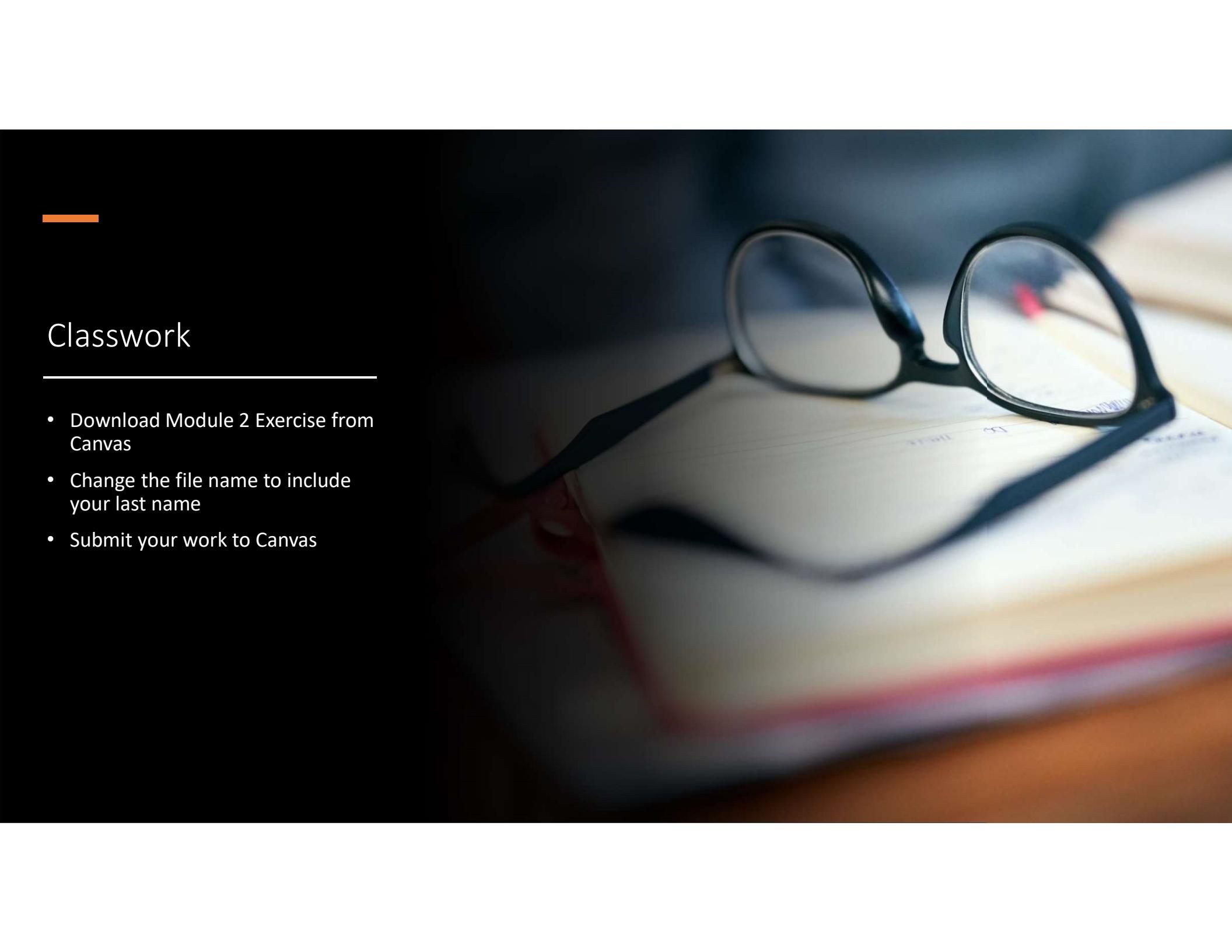
Extensibility

Abstraction



Questions?



A close-up photograph of a pair of dark-rimmed glasses with round lenses. The glasses are positioned diagonally across the frame, resting on a stack of papers. The papers appear to be a notebook or ledger, with some blue and red markings visible through the lenses. The background is blurred, showing more of the notebook and some other papers.

Classwork

- Download Module 2 Exercise from Canvas
- Change the file name to include your last name
- Submit your work to Canvas

Thank you!

