

Module 4: Repetition

- We learned **input/output** methods.
- We learned **variables** and **operations**.
- We learned **Branching** as a flow control.
- Now let's learn **Repetition**.



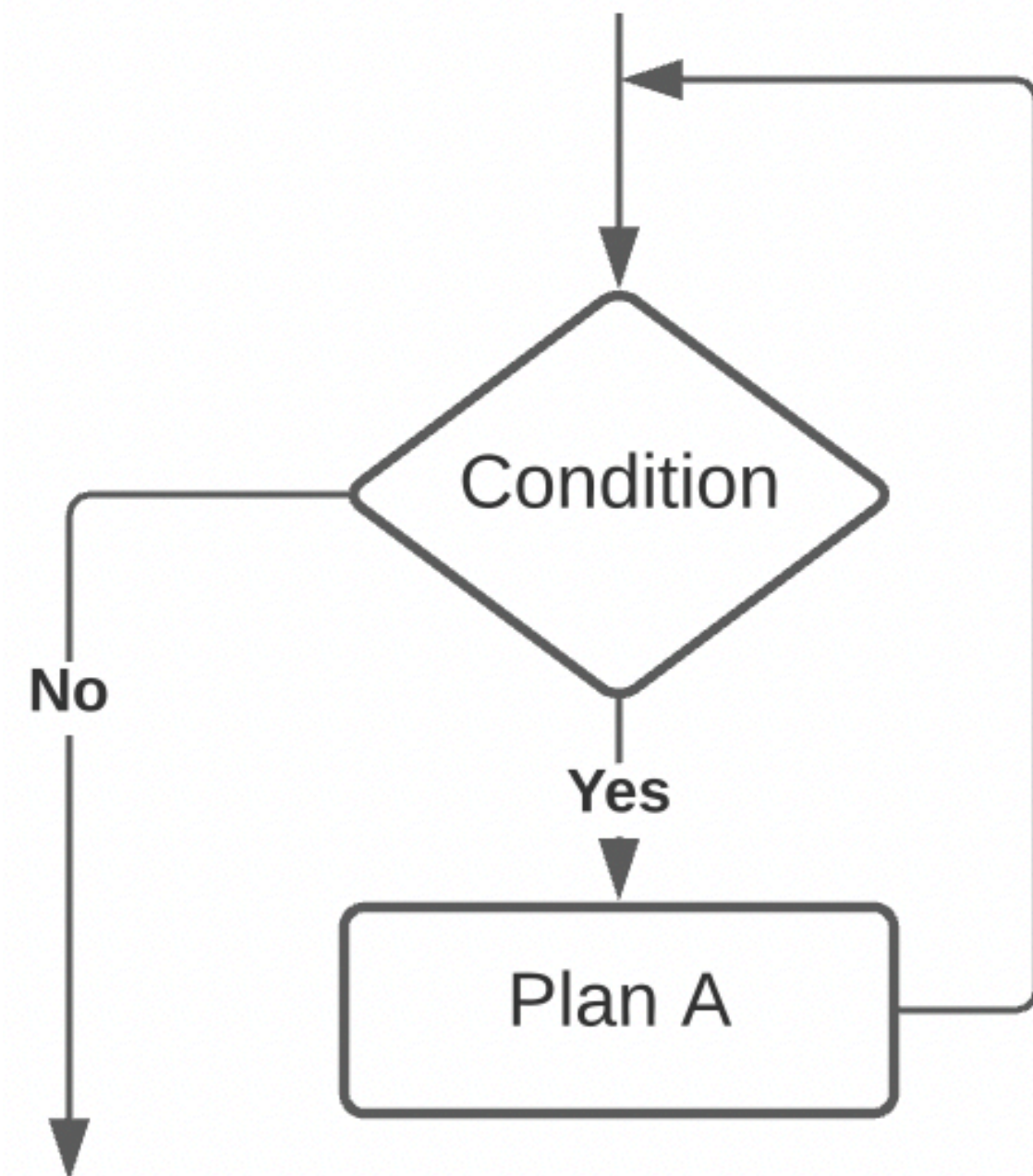
Repetition

- We often need to run programs (or sub-tasks) repeatedly.
- Rather than write the same code again and again, we can set a **repetition** flow control to execute statements based on:
 - **Condition**
 - **Count**



Condition-Based Repetition

- While the condition is tested to be True, the enclosed statements will be executed.



The while Loop

- We can use `while` to start a loop:

```
while condition:  
    statements
```

- The first line known as the `while` clause

- `while` clause specifies the `condition` with a `:`
- List statement(s) with consistent `indentation`
- If the condition is tested to be `True`, the statement(s) in `while` clause will be executed; otherwise, skip and move to next.



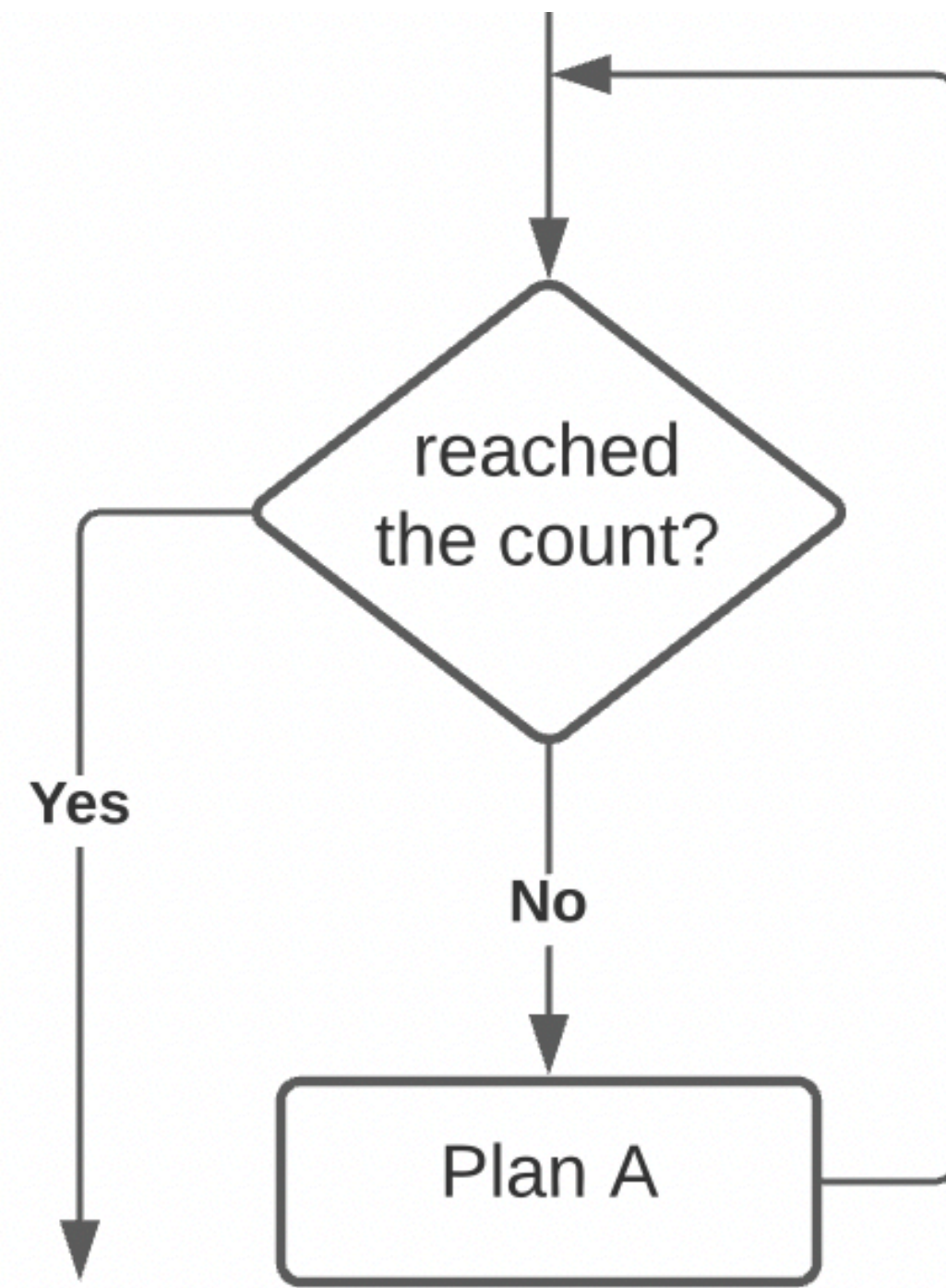
Let's Play in Colab

- Download the **M4Lab1.ipynb** file.
- Upload it to your Colab.
- Finish the tasks.
- Use the discussion board to ask for help.



Count-Based Repetition

- We may also need to repeat the program (or sub-tasks) for a specific number of times.



The for Loop

- We can use `for` to start a loop:

```
for item in [item1, item2, ..., itemn]:  
    statements
```

- The first line known as the `for` clause

- `for` clause specifies the **sequence** of **items** with a `:`
- Iterates once for each **item** in the sequence.
- The **number** of items **n** in the sequence is the number of time the statements will be executed.
- List statement(s) with consistent **indentation**.



The for Loop with range

- We can use `range` to create a sequence for a `for` Loop:

```
for item in range(n):  
    statements
```

- `range()` characteristics:

- One argument: used as ending limit: `range(5) = range(0, 5) = range(0, 5, 1) -> [0, 1, 2, 3, 4]`
- Two arguments: starting value and ending limit: `range(2, 5) = range(2, 5, 1) -> [2, 3, 4]`
- Three arguments: third argument is step value: `range(2, 5, 2) -> [2, 4]`



Let's Play in Colab

- Download the **M4Lab2.ipynb** file.
- Upload it to your Colab.
- Finish the tasks.
- Use the discussion board to ask for help.



continue and break

- In Repetition structure, we can use two special control for the repetitions:

- `continue`

- Skip the rest of the statements and jump to next iteration.

- `break`

- Stop the repetition immediately.



Let's Play in Colab

- Download the **M4Assignment.ipynb** file.
- Upload it to your Colab.
- Finish the tasks.
- Submit your assignment.
- Use the discussion board to ask for help.



Congratulations!

- You finished all 4 Modules in this course!
- Programming in Python is simple and fun, right?
- We are going to learn more in next course and get even more power unlocked!
- See you soon!

