Topic 3.3 - DECISION MAKING

There are many conditions when you write a script, so the students will learn if …else….statements in this section.

The students will learn how to use if statement, and also using the String functions that they have learned from Topic 3 to check user's input.

They also use is statement to GrovePI, for example, they can set up different colour of lights (red, green, blue). The individual light will be on in the different conditions.

The students will be learning the following things in this topic:

- Comparison Operators
- If statement
- If….else….
- Decision flowchart
- Decision pseudocode
- GrovePi kit for Three lights

COMPARISON OPERATORS

Assume a = 5, b = 3

Operator	Description	Example
==	Compare if both equals	a==b returns false
>	Greater than	a > b returns true
>=	Greater or equals to	a >= b returns true
<	Less than	a < b returns false
<=	Less or equal to	a <= b returns false
!=	Not equal	a != b returns true

LOGICAL OPERATORS

Assume a = 5, b = 3, c = 6

Operator	Description	Example

AND	If all conditions are true then the final result is true	(a>b AND c>b) returns true (a<b AND c>b returns false
OR	One of condition is true, the final result is true	(a>b OR c>b) returns true (a<b OR c>b returns true

IF STATEMENT

The if statement contains a logical expression using which data is compared and a decision is made based on the result of the comparison.

If the Boolean expression returns TRUE, then the block of statement(s) inside the if statement is executed. If Boolean expression returns FALSE, then the block of statement(s) inside the if statement is NOT executed

Syntax:

```
if expression:
        statement(s)
```

Note: the indentation MUST apply.

Pseudocode of Using If Statement

```
START Terminal
INPUT a number from keyboard
IF number is greater than zero
DISPLAY “The number is positive”
```

Python Code

```
number = int(input("Please create a number "))
if number> 0:
        print("The number is positive")
```

Note: keyboard is not a numeric value, so int() function has to apply

IF…..ESLE….STATEMENT

There is a condition other than if which is else condition, and this condition is optional

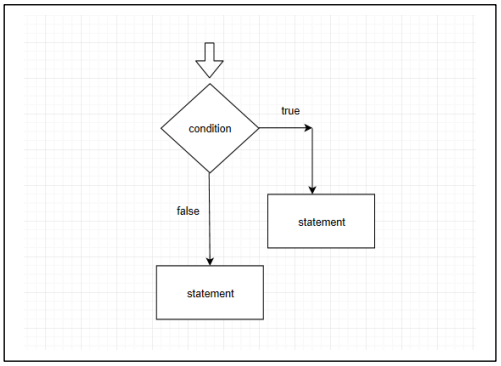
Syntax:

if expression:

statement(s)

else:

statement(s)



Pseudocode of If… Else…

```
START Terminal
INPUT a number from keyboard
IF number is greater than zero
DISPLAY “The number is positive”
ELSE
DISPLAY “The number is NOT positive”
END Terminal
```

Translated Code from the Pseudocode Above

```
number = int(input("Please create a number "))
if number> 0:
        print("The number is positive")
else:
        print("The number is not positive")
```

Note: keyboard is not a numeric value, so int() function has to apply

IF……ELIF….STATEMENT

The elif statement is a multiple optional statement and there could be more else conditions.

Similar to the **else**, the **elif** statement is optional, but unlike **else**, for which

there can be at most one statement, there can be more than one **elif** statements following an **if**.

Syntax:

if expression1:

statement(s)

elif expression2:

statement(s)

Example of Python Code

```
#elif statement
month = int(input("Please enter a month: “))
if month == 1 :
        print("This month is January")
elif month == 2:
        print("This month is February")
elif month == 3:
        print("This month is March")
else:
        print("Invalid input")
```

Let’s translate the Python code above to pseudocode

```
START Terminal
INPUT month from keyboard
IF month equals 1
DISPLAY “This month is January”
ELSE IF month equals 2
DISPLAY “The month is February”
ELSE IF month equals 3
DISPLAY “The month is March”
ELSE
DISPLAY “invalid input”
END Terminal
```

GrovePI Exercise

Important 1: you **MUST** have created a folder on the desktop(Don't delete), this folder will continue be used until the end of your Python class.

1. Plug in two lights in D2 and D4,

2. **Step 1:** Menu > Programming > Python 2

   Step 2: File > New

   Step 3: Type the following code:

```
import time
from grovepi import *
num = raw_input("Please enter a number: ")
number = int(num)
if number%2 ==0:
        led = 2 #LED in D2 on
        pinMode(led, "OUTPUT")
        digitalWrite(led, 1)
        time.sleep(5)
        digitalWrite(led, 0)
else:
        led=4 #LED in D4 on
        pinMode(led, "OUTPUT")
        digitalWrite(led, 1)
        time.sleep(5)
        digitalWrite(led, 0)
```

   Step 4: Press F5 to debug, the LED light will be fading when there is no error

Important 2: Please unpack your hardware, and put things together to hand it into your teacher before the end of Python class.

RESOURCE ON MOODLE:

- Python Decision (ppt)

LINKS FOR STUDENTS

- https://www.w3schools.com/python/python_conditions.asp
- https://www.youtube.com/watch?v=PqFKRqpHrjw