Computational Thinking?

Session-2

Were you able to finish pre-class work for Computational Thinking?

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4 Algorithm

Review

Algorithm

- Step by step
- Clearly defined
- One simple job at a time
- Instruct computer what to do

Let's brew a coffee

?

Let's brew coffee

- Prepare ingredients
- Make coffee
- Prepare serving
- Enjoy

1 Pseudocode

Pseudocode

Let's discuss and try to predict what does pseudocode mean!

Pseudocode

- Pseudocodes are one of two popular ways to represent an algorithm.
- Pseudocode is an informal way of representing a computer program or an algorithm.
- It looks like a programming language though, it should be written in a programming language for it to be executed. It's language-agnostic.
- Writing pseudocode is basically writing what you want your programm to do in English.
- Aims to mimic the general style of a programming language

```
OUTPUT 'What is your name?'
INPUT user inputs their name
STORE the user's input in the name variable
OUTPUT 'Hello' + name
OUTPUT 'How old are you?'
INPUT user inputs their age
STORE the user's input in the age variable
IF age >= 70 THEN
    OUTPUT 'You are aged to perfection!'
ELSE
    OUTPUT 'You are a spring chicken!'
```

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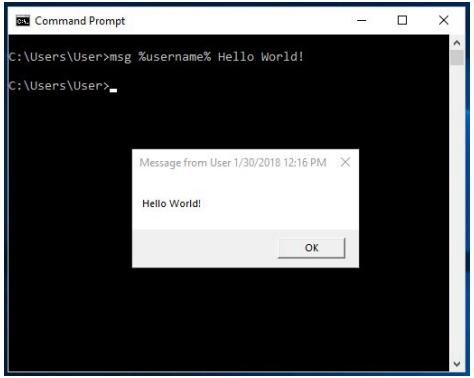

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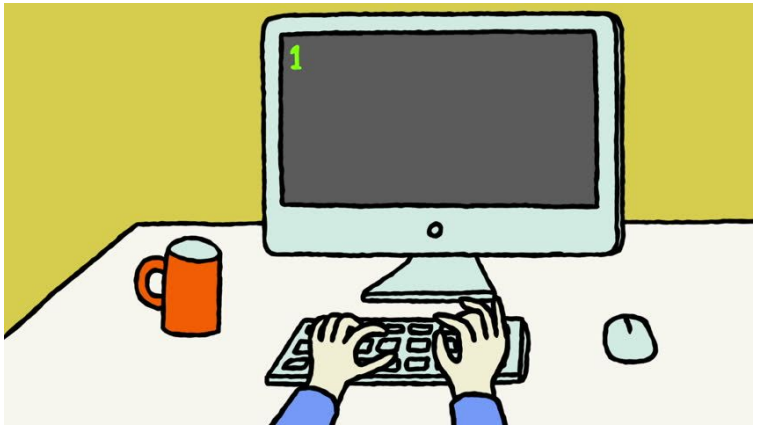

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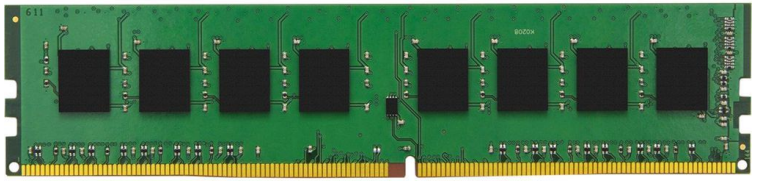

Keyword

There are these keywords that are widely used, you can use your own keywords, but these are the most frequently used amongst other computer programmers and should not be used as variable names.

```
START, BEGIN: This is the start of your pseudocode.
INPUT: This is data retrieved from the user through the input device.
READ, GET: This is used when reading data from a data file.
PRINT, DISPLAY, SHOW, OUTPUT: This will show your output to a screen.
COMPUTE, CALCULATE: To calculate the result of the expression.
SET, INIT: To initialize values
INCREMENT, BUMP: To increase the value of a variable
DECREMENT: To reduce the value of a variable
END: This is the end of your pseudocode
```

Question

Let's write a pseudocode for calculating Mary's wage.

Inputs : hours and rate

Output: pay

Students, write your response!

Keyword

Let's write a pseudocode for calculating Mary's wage.

Inputs : hours and rate

Output: pay

```
Begin
INPUT hours
INPUT rate
pay = hours * rate
OUTPUT pay
End
```

IF - ELSE IF - ELSE

This keyword is used if a certain condition has to be met for the upcoming block to be executed. For example:

```
IF you are happy
        Then smile
ENDIF
```

```
If you are tired
        Then rest
else if you are stressed
        Then relax
else
        Keep working
```

As you can see we also use indentation in order to declare that "smile" is being executed inside the if statement above it.

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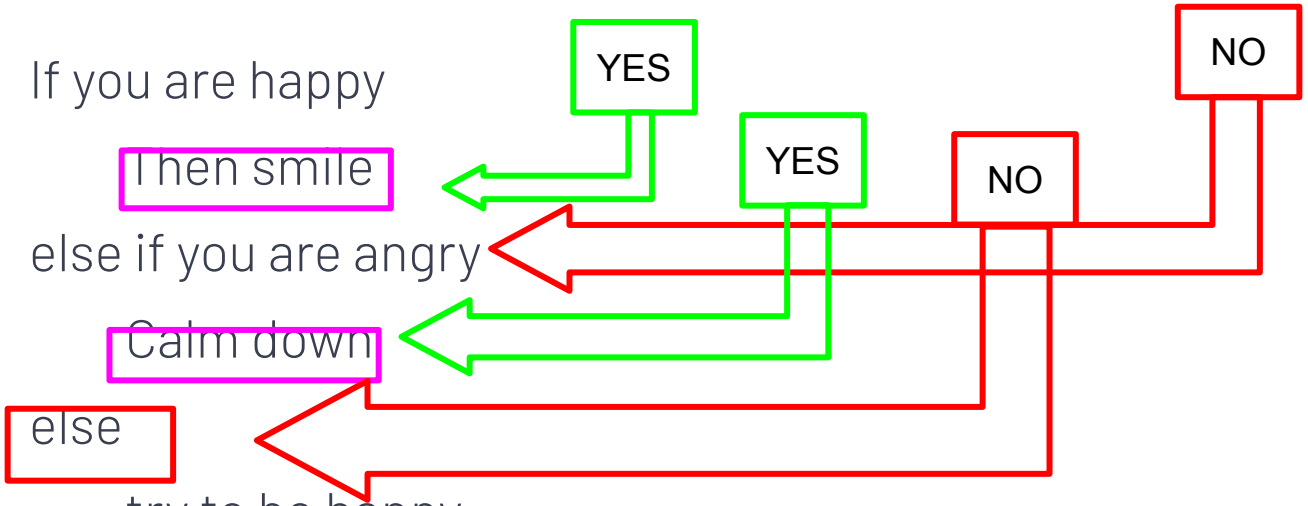

Exercise

Write a pseudocode that takes a number as an input and prints true if it is greater than 10 and false otherwise.

Students, write your response!

Exercise

```
read num
if num > 10
        print true
else
        print false
```

Question

Let's write a pseudocode for calculating Mary's wage.

Inputs : hours and rate

Output: pay

Students, write your response!

IF - ELSE IF - ELSE

```
Begin
INPUT hours, rate
IF hours < 40
THEN
    pay = hours * rate
ELSE
    pay = 40 * rate + (hours - 40) * rate *1.5
OUTPUT pay
End
```

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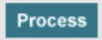
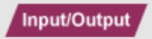
Flowcharts

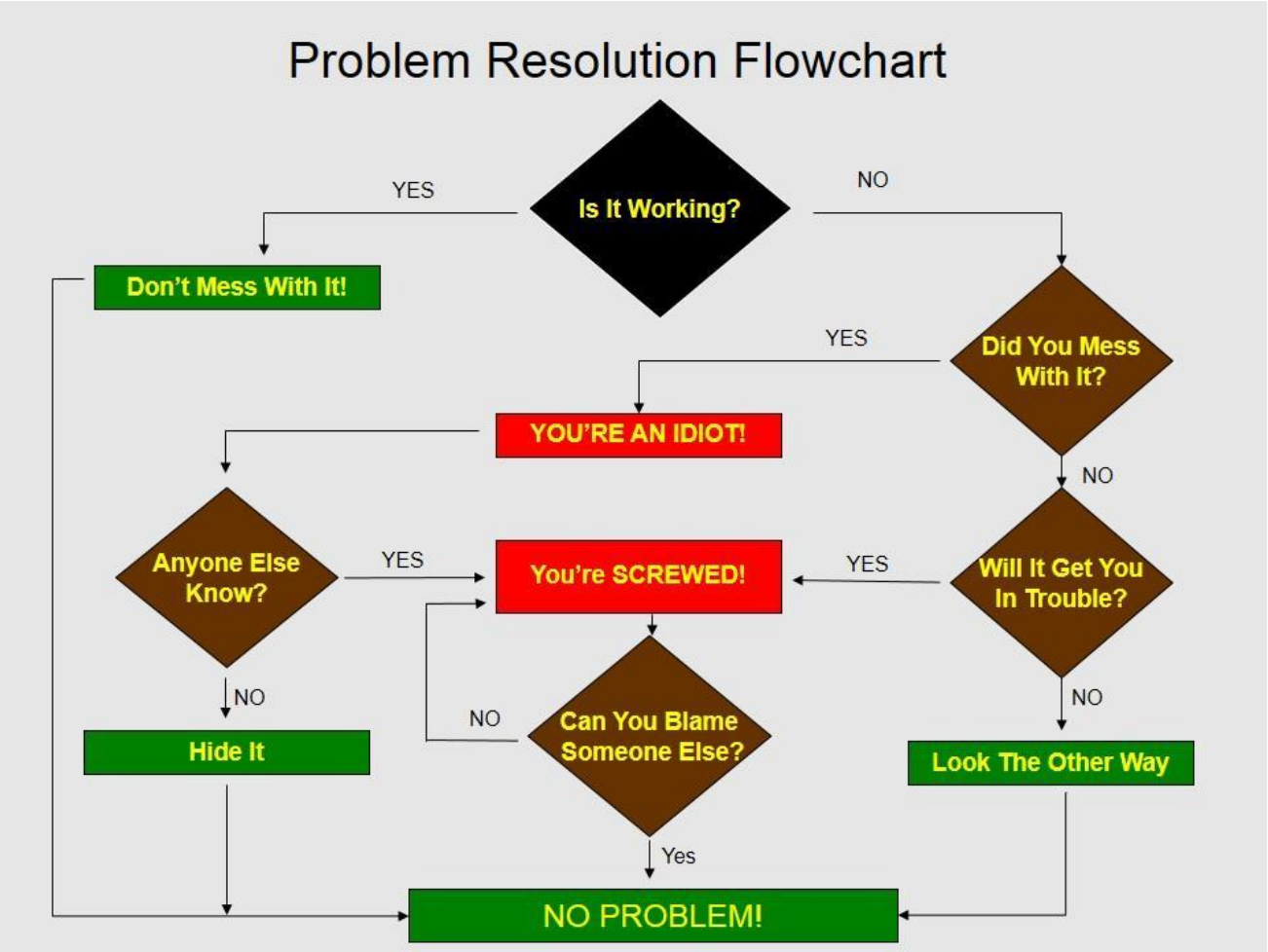
Flowcharts

Let's discuss and try to predict what does flowchart mean!

Flowcharts

- A flowchart is a diagram that represents a sequence of instructions.
- Flowcharts have standard symbols to represent different instructions.

Name	Symbol	Usage
Start or Stop		The beginning and end points in the sequence.
Process		An instruction or a command.
Decision		A decision, either yes or no.
Input or Output		An input is data received by a computer. An output is a signal or data sent from a computer.
Connector		A jump from one point in the sequence to another.
Direction of flow		Connects the symbols. The arrow shows the direction of flow of instructions.


Problem Resolution Flowchart
Is It Working?
YES
NO
Don't Mess With It!
Did You Mess With It?
YES
YOU'RE AN IDIOT!
NO
Anyone Else Know?
YES
You're SCREWED!
YES
Will It Get You In Trouble?
NO
NO
Hide It
NO
Can You Blame Someone Else?
NO
Look The Other Way
Yes
NO PROBLEM!

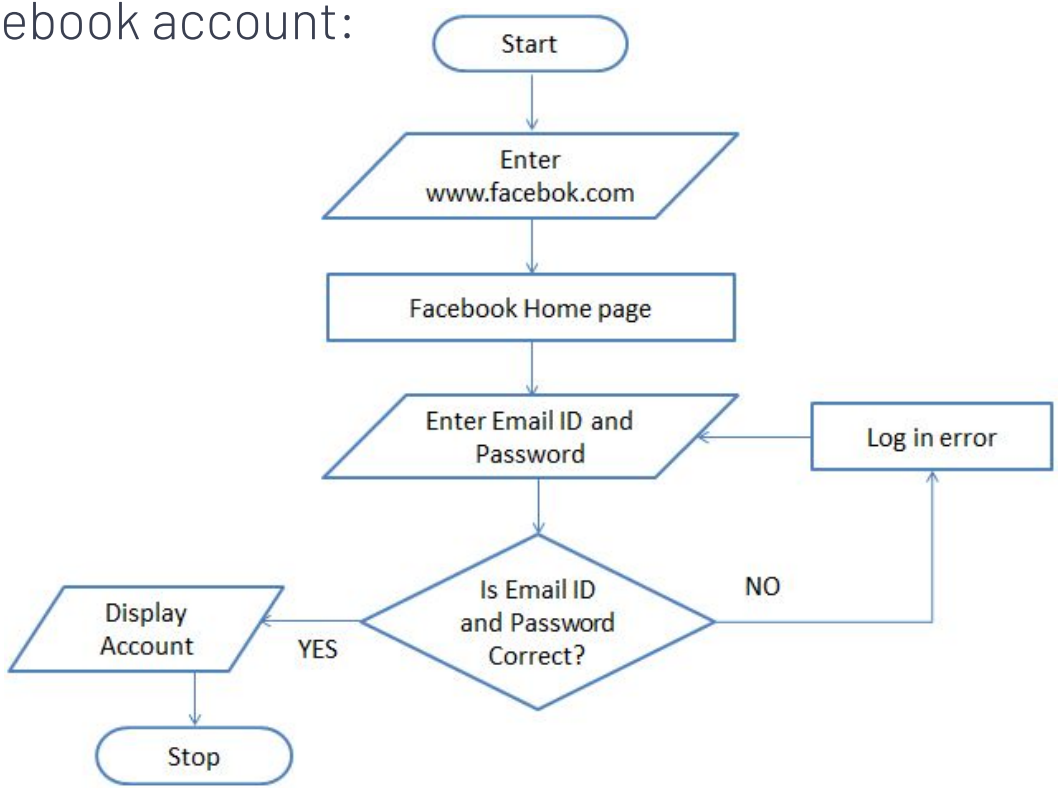
Login Diagram

Draw a flowchart to login to your facebook account

Students, draw anywhere on this slide!

Login Diagram

A flowchart to login to facebook account:



FOR structure

For loop runs for each element inside a group. For example:

```
For every day of the week
        Count;
endfor
```

FOR structure

For loop runs for each element inside a group.
For example:

For every 25 minutes of study

    Earn one Pomodoro;

endfor

Let's wash the dishes

Let's wash the dishes. Think that we have all the tools etc.

Let's wash the dishes

```
gather the dirty dishes
if you have a dishwasher around you
        put the dirty dishes inside the dishwasher
        set the settings of the dishwasher
        while the time set is not over
                wait
else
        while dishes are not clean
                take one of the dishes
                wash it with your hand
                dry it and put it aside
```

WHILE Structure

While is similar to the for loop, differently it runs the loop until the condition provided is unsatisfied. Example:

```
Apples = 5
Oranges = 10
While apples < oranges
        increase apples;
endwhile
```

THANKS!

Any questions?