

# Algorithm Design

## Definition

### **Variable (flowchart and pseudo-code):**

- Named storage space for a value that can be changed while the algorithm is running

### **Initialise:**

- To store or assign a value to a variable for the first time.

### **Update:**

Updating a variable.

## Storing values in variables

In an algorithm, we use = or  $\leftarrow$  to store a value in a variable

e.g.

x = 5
-------

word  $\leftarrow$  "banana"

### Note

Characters starting with a letter enclosed in quotation marks are taken as a string

Characters starting with a letter without quotation marks are taken as a variable name

numerical characters without quotation marks are taken as integers or floating numbers

## List variables

```
teachers = ['Aurelius', 'Robin', 'Samuel']
```

Each value is identified by a position number **starting from 0**. We can access each entry or element in the list by using the variable name followed by its position number in **square brackets**.

```
teachers[0], teachers[1], teachers[2]
```

We can change the value of an individual element in the list.

```
teachers[0] = 'Jovita'
```

## What is a flowchart?

<b>Step 1: Leave home.</b>
Step 2: Check the time.
...

## Symbols

Untitled

```
flowchart TD
    A(Start) --> B{Is it?}
    B -->|Yes| C[/OK/]
    C --> D[Rethink]
    D --> B
    B ---->|No| E(End)
```

## Three Semantics of Programming

- Sequences
- Selections

- Iterations

# Pseudo-Code

Depends on organisation.

## Sequence Constructs

code → code → code (top to bottom, left to right)

## Selection Constructs

```
IF condition AND/OR condition THEN  
  
ELSEIF condition THEN  
  
ENDIF
```

```
IF condition AND/OR condition THEN  
  
ELSE  
    INPUT a  
    IF a ... THEN  
  
    ENDIF  
  
ENDIF
```

## Iteration Constructs

```
WHILE... ENDWHILE  
FOR... NEXT
```

# Revision: Flowcharts

## Common Symbols

- **Pill:** Terminator
- **Rectangle:** Process
- **Rhombus:** Decision

## Rules

- Don't let the flow lines cross.
- Write conditions as a question.