



Basic Program Structure

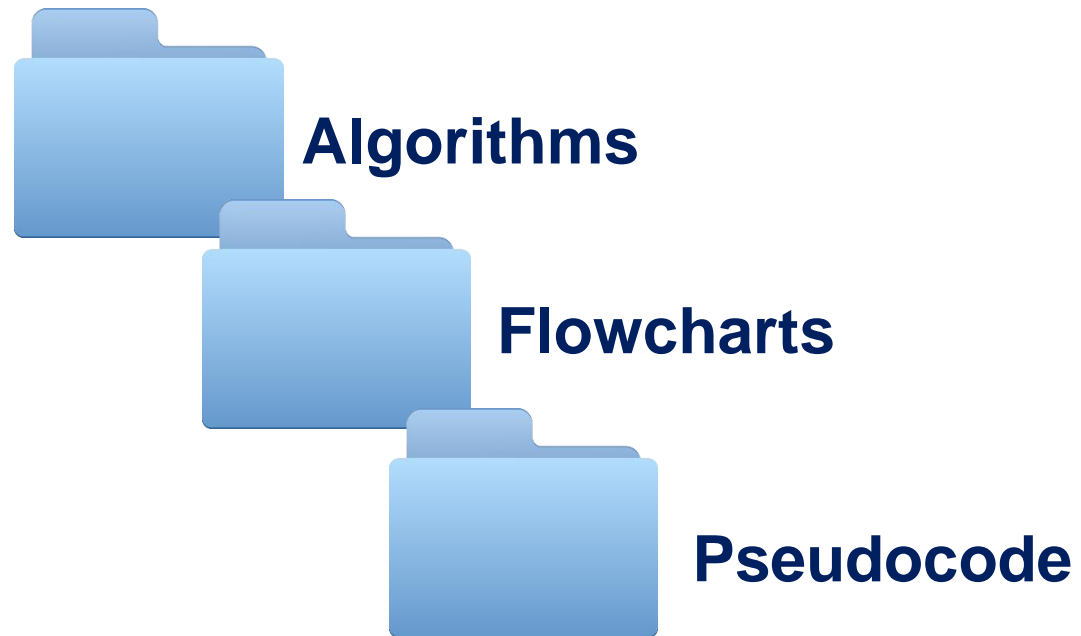
Part A: Flowchart and Pseudo-code



At the end of this lesson, you should be able to:

- Define what an algorithm is
- Express an algorithm using
 - Flowcharts
 - Pseudo-code
- Formulate a simple problem
- Express the solution(s) of a problem in such a way that a computer—human or machine—can effectively carry out

Topic Outline



Scenario 1: Finding the Nearer Coffee Shop

Algorithms are basically sequential (step-by-step).



Scenario 1: Finding the Nearer Coffee Shop

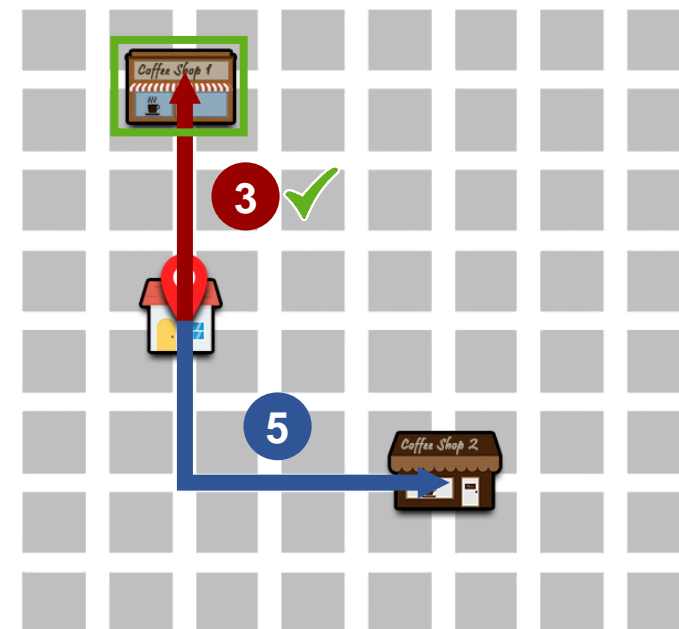
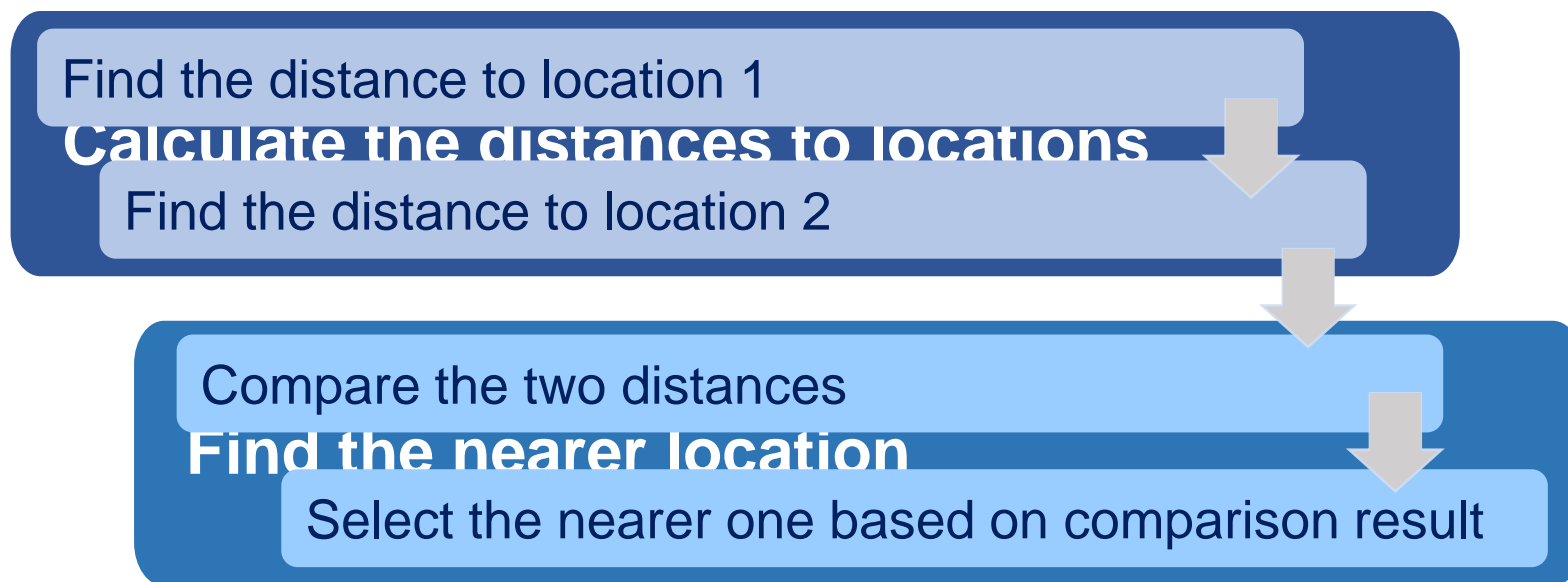
Calculate the distances to locations

Find the nearer location

Algorithms (Cont'd)

- When you formulate a method/ procedure for solving a problem, it has to be computable.
- Such a procedure is called **Algorithm**.

Scenario 1: Finding the Nearer Coffee Shop



Algorithms (Cont'd)



How to construct an Algorithm?

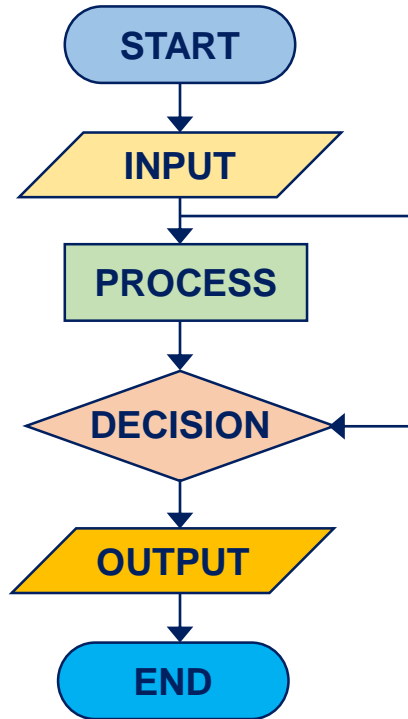
General Notes:





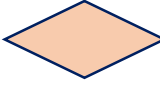
- No strict rules
- Uses informal language – combination of English and keywords

| Common Keywords | Other Keywords |
|-----------------|--|
| IF, ELSE, WHILE | READ, PRINT, INITIALIZE, COMPUTE, ADD, SUBTRACT |

- Usually starts an operation sentence with a verb (description should be **concise** and **precise**)

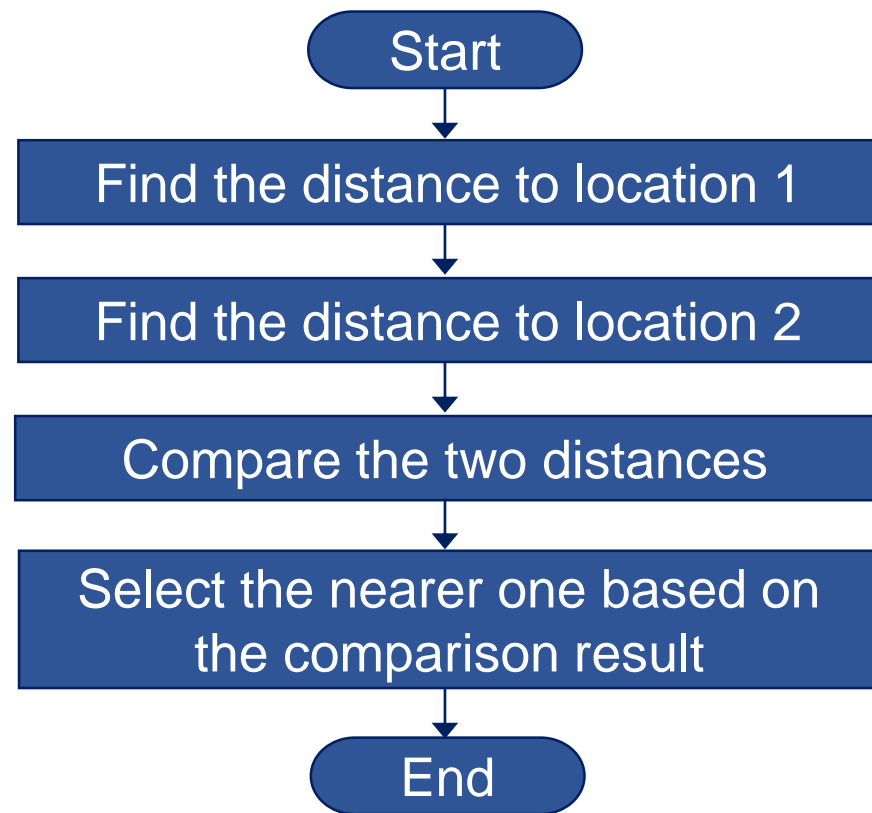
Flowchart: a representation of an algorithm using diagram for effective visualization



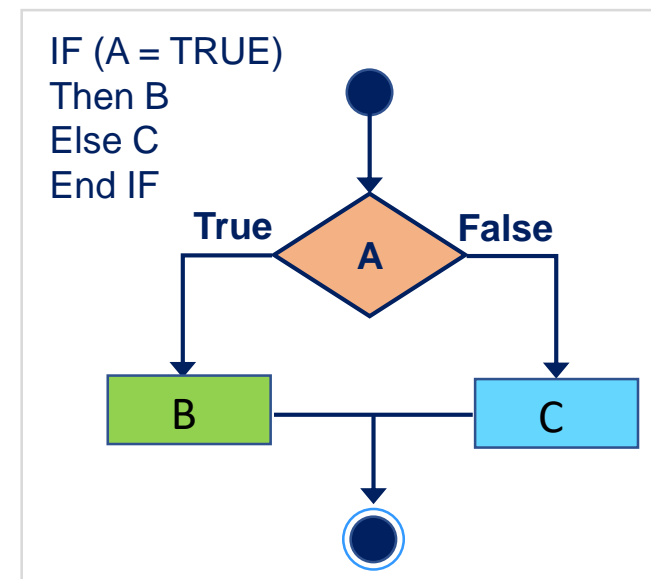
| Name | Symbol | Use in Flowchart |
|---------------|---|--|
| Oval |  | Denotes the beginning or end of a program |
| Flow line |  | Denotes the direction of logic flow in a program |
| Parallelogram |  | Denotes either an input operation (e.g., INPUT or an output operation (e.g. PRINT) |
| Rectangle |  | Denotes a process to be carried out (e.g. an addition) |
| Diamond |  | Denotes a decision or branch to be made; the program should continue along one of two routes |

Flowcharts (Cont'd)

Scenario 1: Flowchart 1

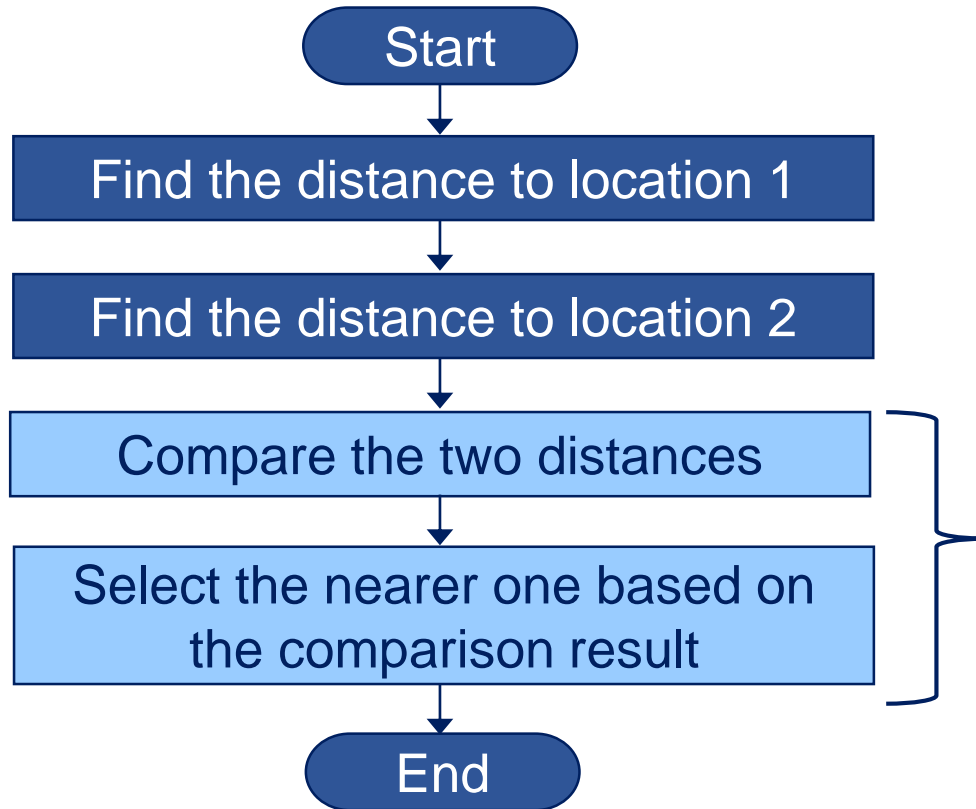


May include **Branching**
(making selection)

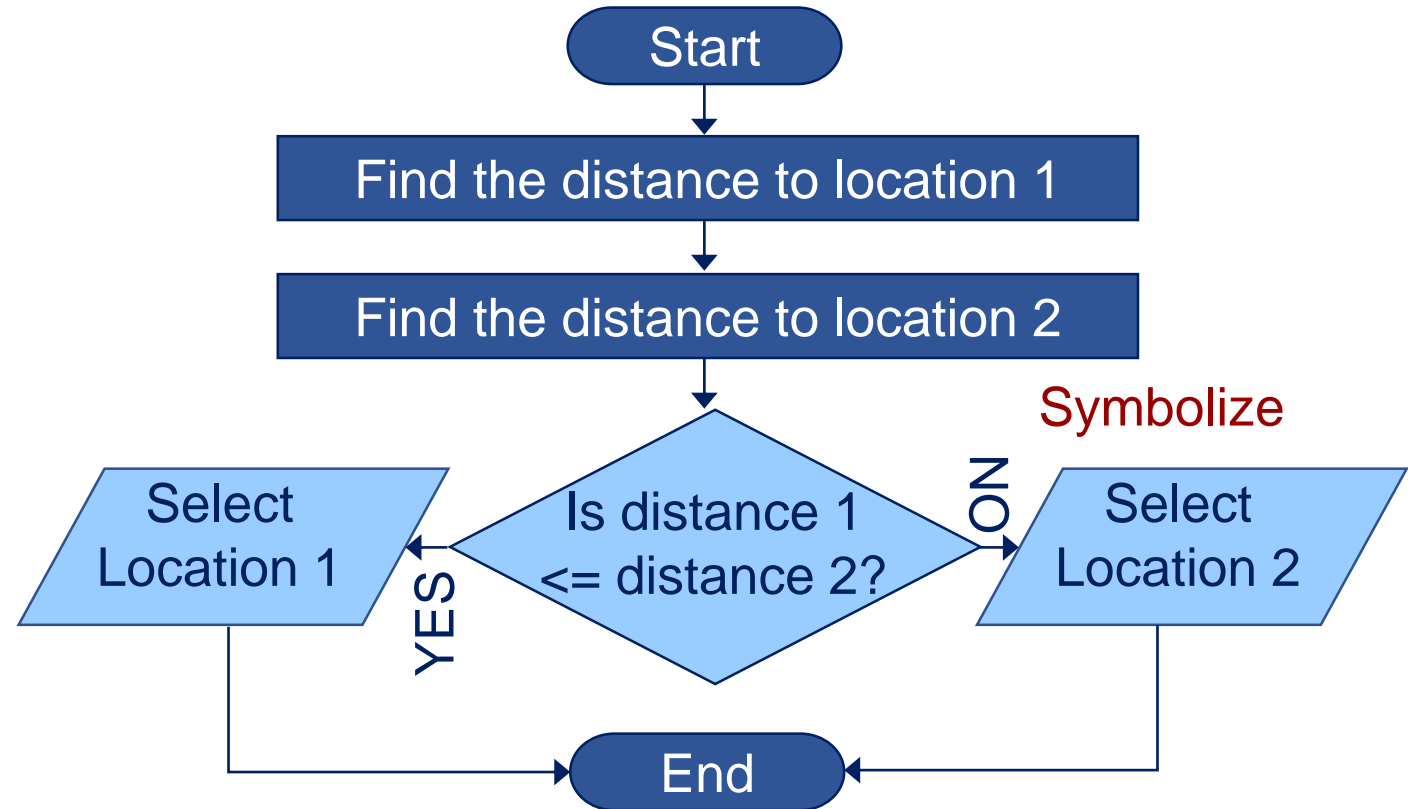


Flowcharts (Cont'd)

Scenario 1: Flowchart 1

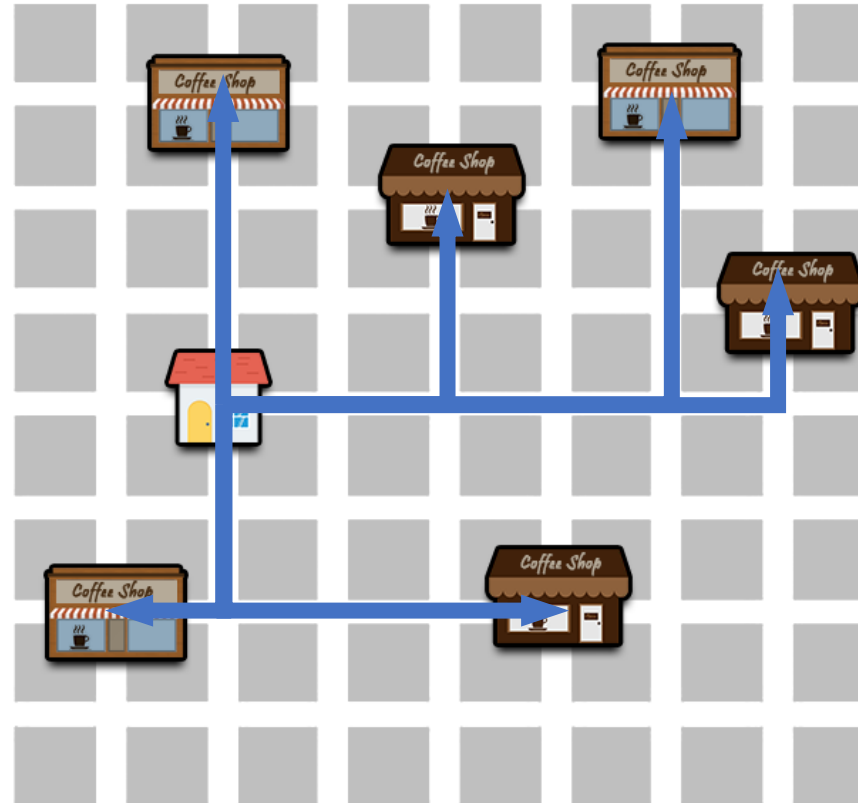


Flowchart 2



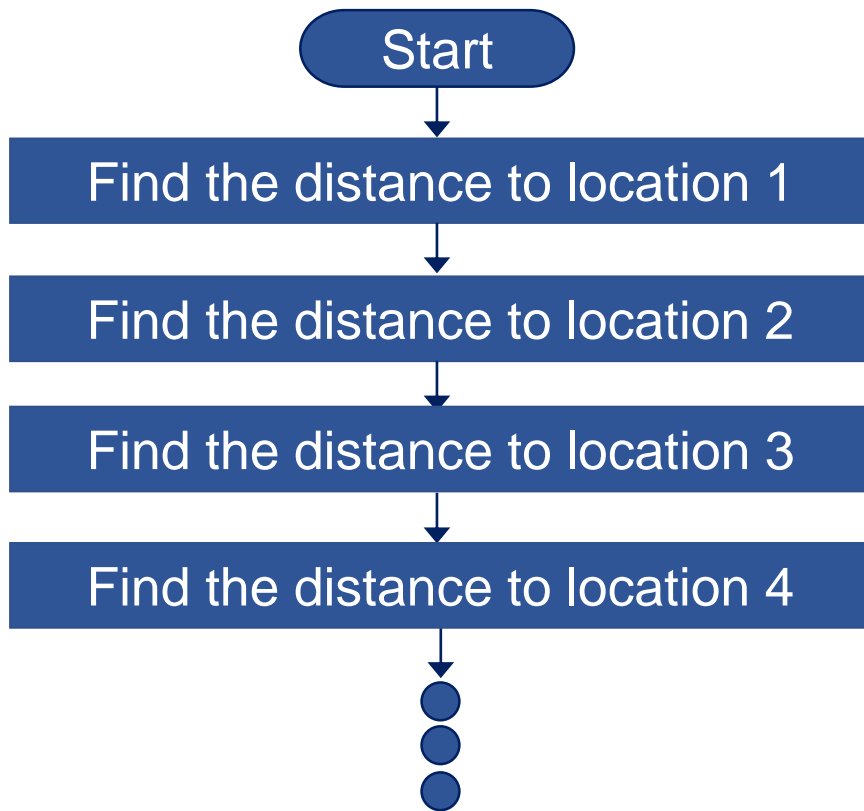


What if there were many coffee shops?

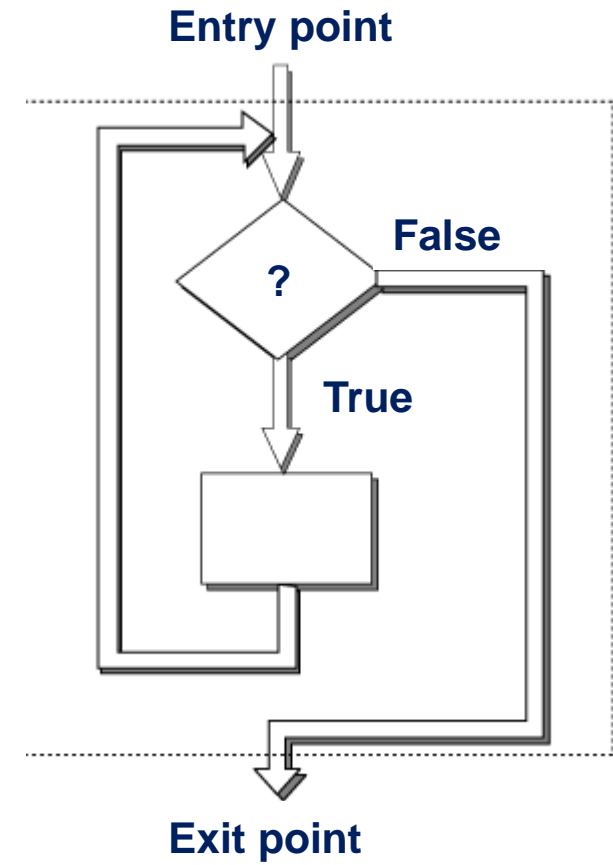




What if there were many coffee shops?

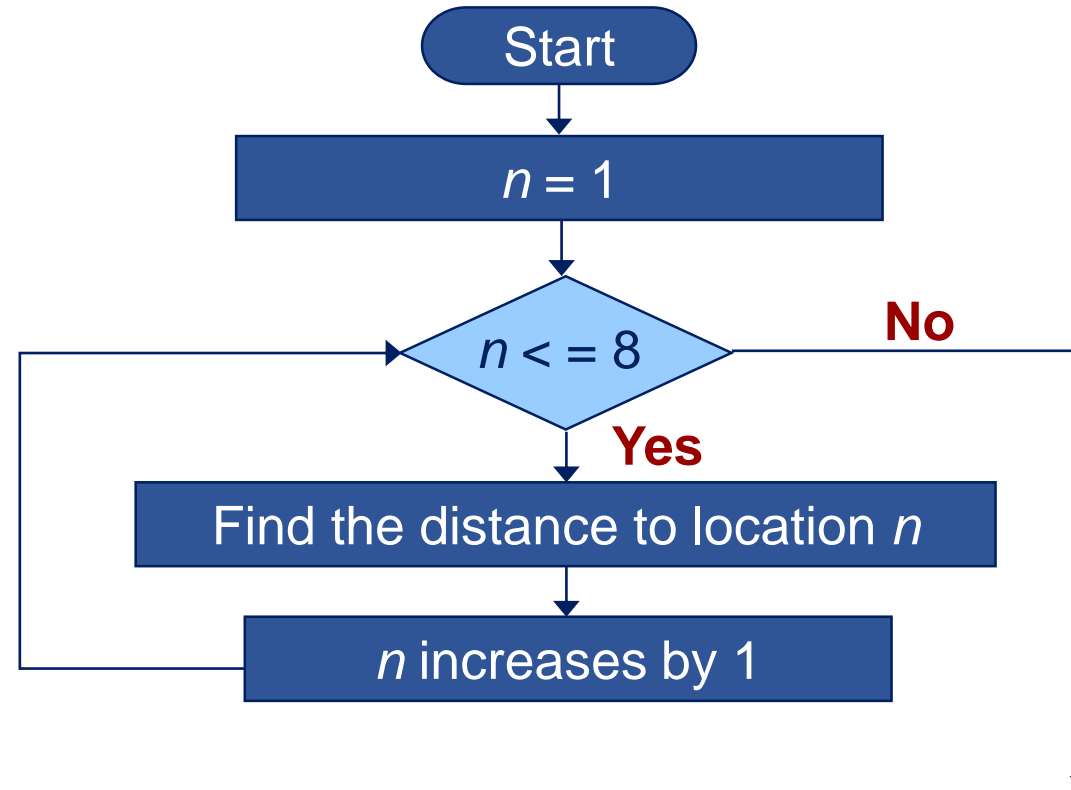


May include
Looping
(repeating
certain
operations)



Flowcharts (Cont'd)

May include
Looping
(repeating certain
operations)



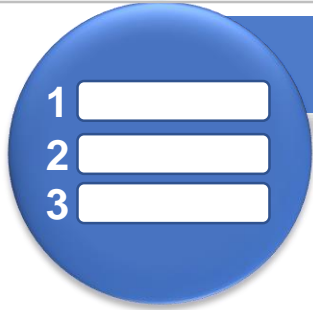
Find nearest location

Data Structure (Ch. 4); Function (Ch. 5 & 6);
Algorithm (Ch.7)

i More on this later..

Pseudocode: pronounced as /'s(j)u:dəʊ,kəʊd/ 

- IDEA: directly uses informal English to describe an algorithm step by step with one step per line
- Uses the structural conventions of a normal programming language
 - but is intended for human reading rather than machine reading

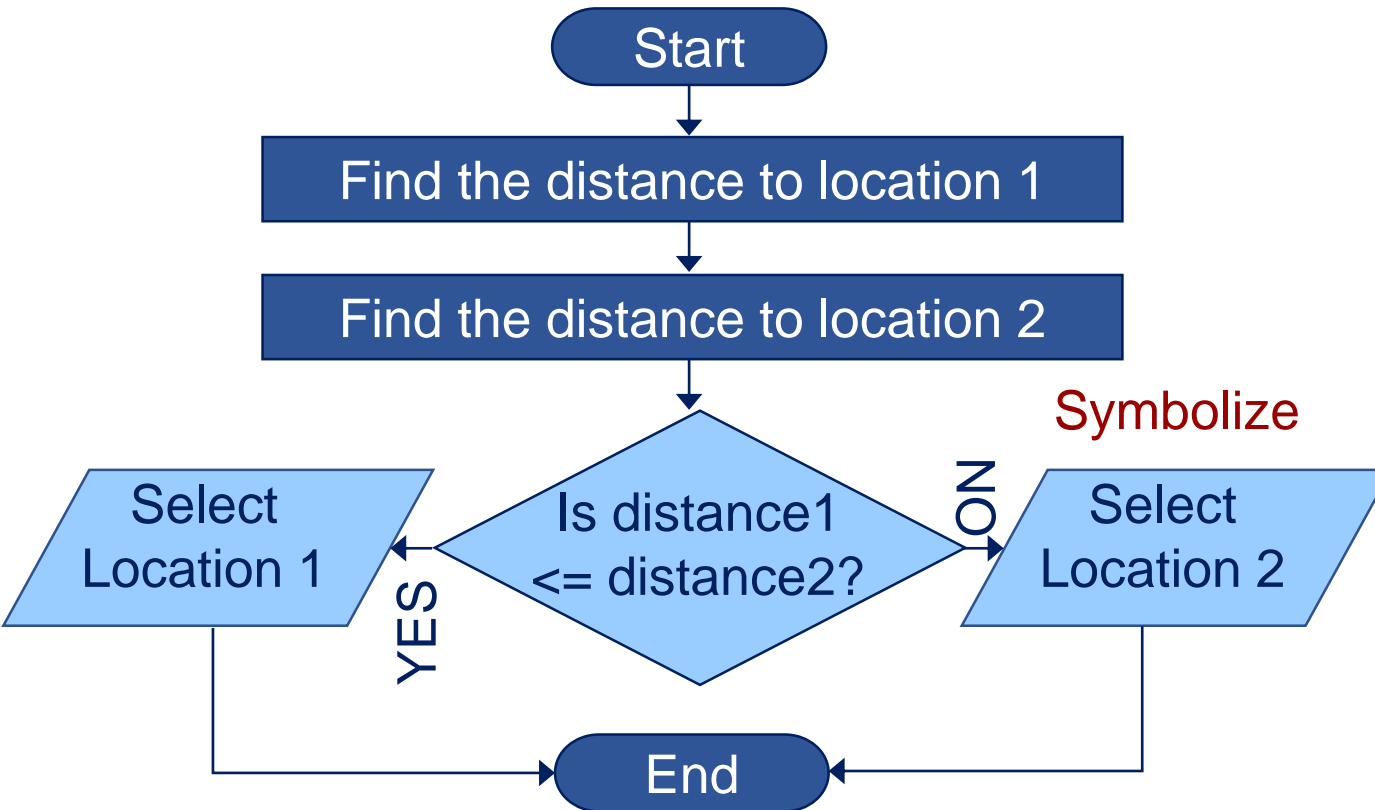


Guidelines

- *Write one statement per line only*
- *Capitalize the keywords*
- *Indent to show hierarchy*
- *End multi-line structures*
- *Keep statements programming-language independent*

Flowchart vs Pseudocode

Flowchart

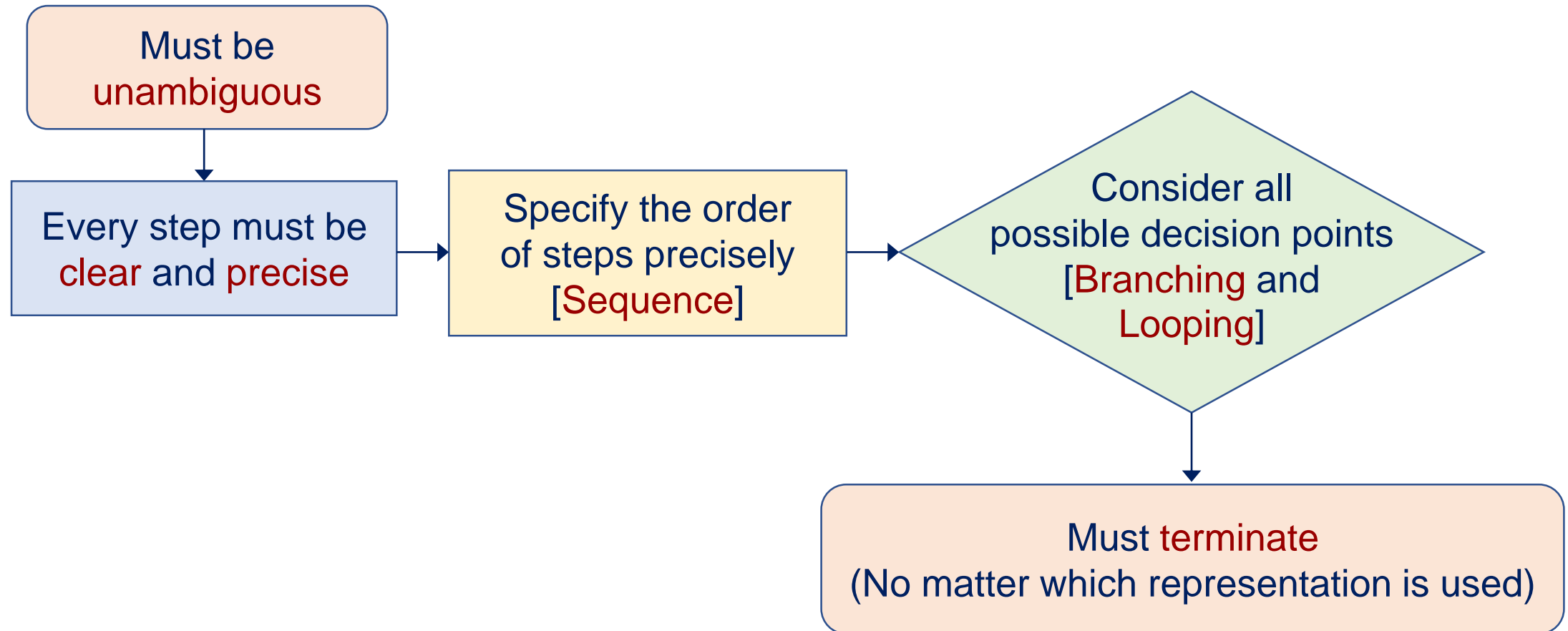


Symbolize

Pseudocode

```
FIND the distance to location 1
FIND the distance to location 2
IF distance1 < = distance2
    SELECT Location 1
ELSE
    SELECT Location 2
END IF
```

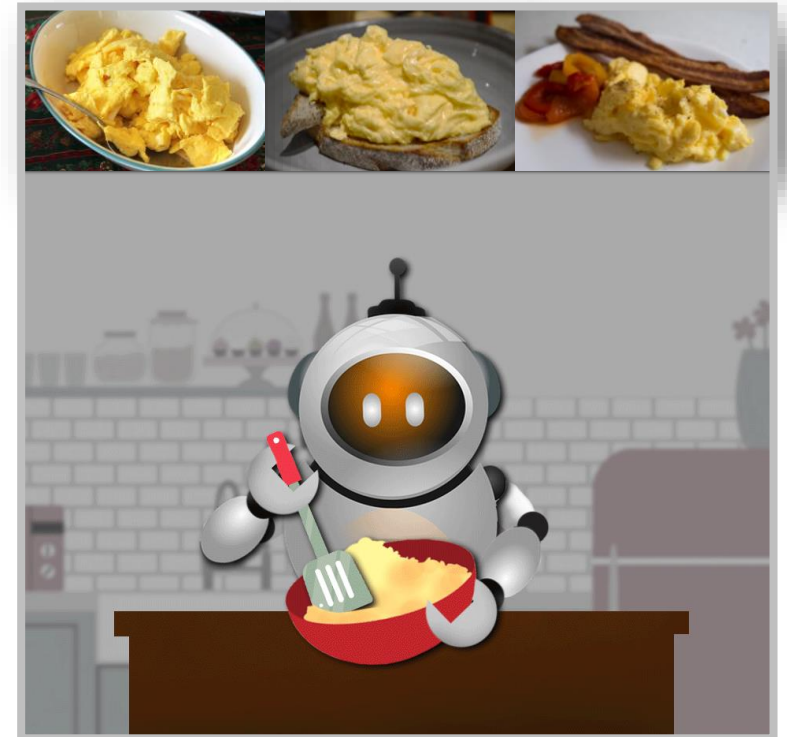
Summary: Expressing an Algorithm



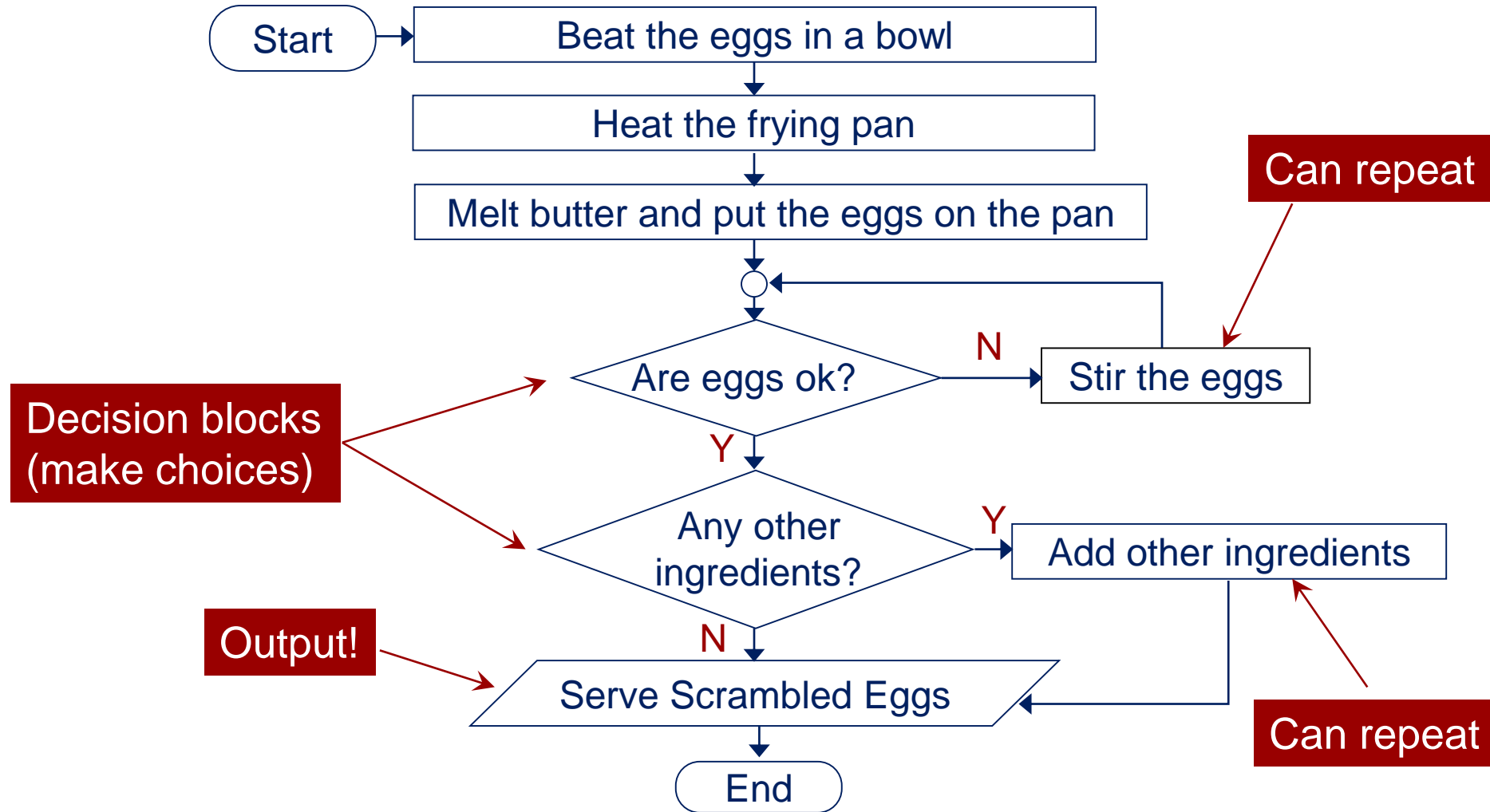


Making Scrambled Eggs

1. Beat the eggs for 20 to 35 seconds in a bowl
2. Heat a frying pan over a medium-low heat
3. Melt some butter in the frying pan
4. Cook eggs on the pan and stir eggs while cooking
5. Add other ingredients
6. Serve the scrambled eggs



Scenario 2 (Making Scrambled Eggs): Flowchart



Scenario 2 (Making Scrambled Eggs): Pseudocode

```
BEAT the eggs for 20 to 35 seconds in a bowl
HEAT a frying pan over a medium-low heat
MELT some butter in the frying pan and PUT eggs on pan
WHILE eggs not okay
    STIR eggs while cooking
END WHILE
IF any ingredients
    Add other ingredients
END IF
SERVE the scrambled eggs
```



Is an algorithm readable by computers?



Is an algorithm readable by computers?

Answer

No

References for Images

Placeholder

Knowledge Check Questions