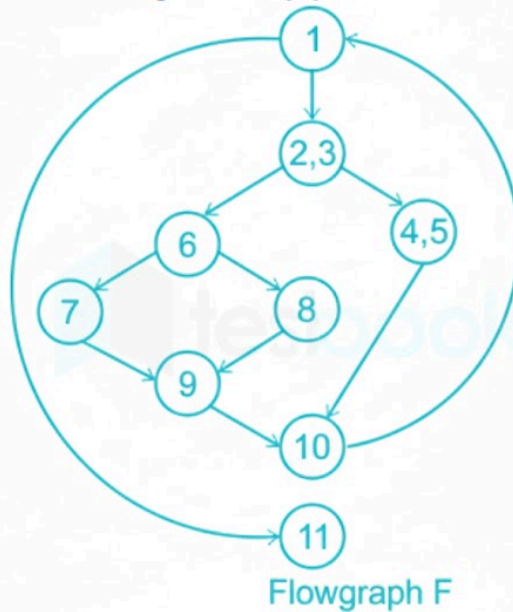


SE Numericals

Cyclometric Complexity

A flow graph F with entry node (1) and exit node (11) is shown below:



1. How many predicate nodes are there and what are their name?

Predicate nodes are nodes in the flow graph where control can branch in two or more directions; these correspond to decision points in a program.

There are 3 predicate nodes:

Node 1

Node 6

Node (2,3)

2. How many regions are there in flow graph F?

Regions in a flow graph are the areas enclosed by edges, including the area outside.

There are 4 regions in flow graph F .

3. What is the cyclometric complexity of flowgraph F?

Cyclometric complexity can be found using the formula:

$$V(G) = E - N + 2$$

Where,

E represents number of edges

N represents number of nodes, It also equals the number of regions or number of predicate nodes plus one

The cyclometric complexity of flow graph F is 4.

4. How many nodes are there in the longest independent path?

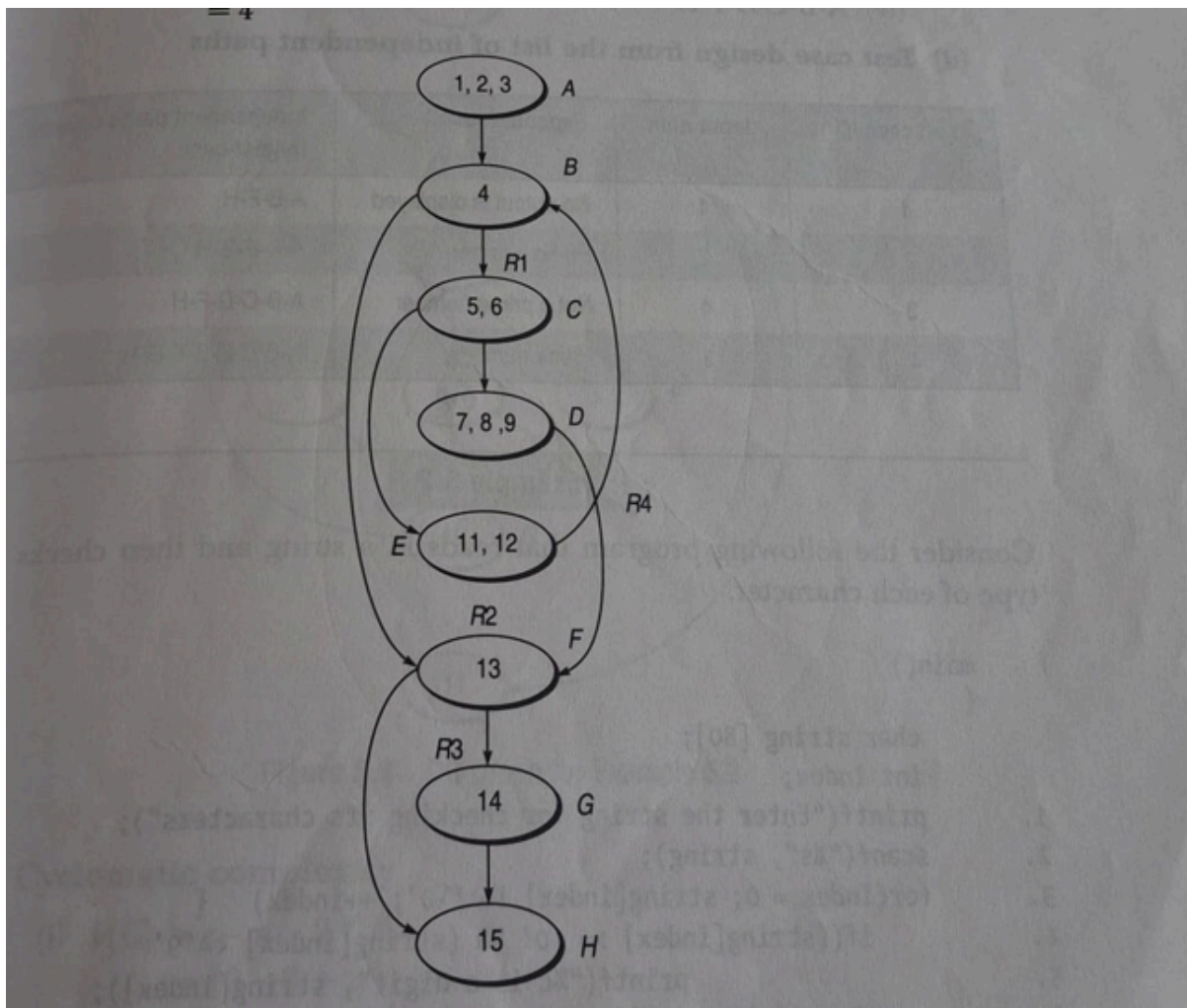
The longest independent path is the path from entry to exit passing through the maximum number of nodes without repetition (if no path is left only then it can be repeated).

There are 8 nodes in the longest independent path from node 1 to node 11

5. How many nodes are there in flow graph F?

Count each node in the flow graph diagram.

There are 9 nodes in flow graph F.



1. How many predicate nodes are there and what are their name?

Predicate nodes are nodes in the flow graph where control can branch in two or more directions; these correspond to decision points in a program.

There are 3 predicate nodes:

Node 4

Node (5,6)

Node 13

2. How many regions are there in flow graph F?

Regions in a flow graph are the areas enclosed by edges, including the area outside.

There are 5 regions in flow graph F.

3. What is the cyclometric complexity of flowgraph F?

Cyclometric complexity can be found using the formula:

$$V(G) = E - N + 2$$

Where,

E represents number of edges

N represents number of nodes, It also equals the number of regions or number of predicate nodes plus one

The cyclometric complexity of flow graph F is 4.

4. How many nodes are there in the longest independent path?

The longest independent path is the path from entry to exit passing through the maximum number of nodes without repetition (if no path is left only then it can be repeated).

There are 7 nodes in the longest independent path from node 1 to node 15

5. How many nodes are there in flow graph F?

Count each node in the flow graph diagram.

There are 8 nodes in flow graph F.

Function Point Calculation

Compute the function point value for a project with the following information domain characteristics.

Number of user inputs: 32

Number of user output: 60

Number of user enquiries: 24

Number of files: 8

Number of external interfaces: 2

Assume that all complexity adjustment value are average and $\sum fi = 40$

Given:

- Number of user inputs (EI) = 32
- Number of user outputs (EO) = 60
- Number of user enquiries (EQ) = 24
- Number of files (ILF) = 8
- Number of external interfaces (EIF) = 2
- All complexity weights = **Average**
- Sum of Fi values = 40

Using Average Complexity Weights:

Component	Avg Weight
EI (inputs)	4
EO (outputs)	5
EQ (enquiries)	4
ILF (files)	10
EIF (interfaces)	7

$$\text{UFP} = 32(4) + 60(5) + 24(4) + 8(10) + 2(7)$$

$$\text{UFP} = 618$$

Compute Value Adjustment Factor:

$$\text{VAF} = 0.65 + 0.01 \times \sum Fi$$

$$\text{VAF} = 0.65 + 0.01 * (40) = 1.05$$

Compute Final Function Points:

$$FP = UFP \times VAF$$

$$FP = 618 \times 1.05 = 648.9$$

Estimation Costs

Earned Value Analysis (EVA)

Earned Value Analysis is a project management technique used to measure project performance and progress.

It compares three key values:

- **PV (Planned Value)** – what you planned to complete
- **EV (Earned Value)** – what you actually completed
- **AC (Actual Cost)** – what you actually spent

EVA helps determine:

- Cost efficiency (CPI)
- Schedule efficiency (SPI)
- Future cost projections (EAC, ETC)

Given:

$$AC = 15000$$

$$BAC = 22000$$

$$EV = 13000$$

$$CPI = 0.8$$

Estimate at Completion (EAC)

For CPI-based estimate:

$$EAC = \frac{BAC}{CPI}$$

Substitute:

$$EAC = \frac{22000}{0.8} = 27500$$

Estimate to Complete (ETC)

$$ETC = EAC - AC$$

Substitute:

$$ETC = 27500 - 15000 = 12500$$

Final Answers

$$EAC = 27500$$

$$ETC = 12500$$