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Course : Software Quality Assurance/Test

Data Flow Based Testing :-

* Data flow based testing is a type of Structural testing.

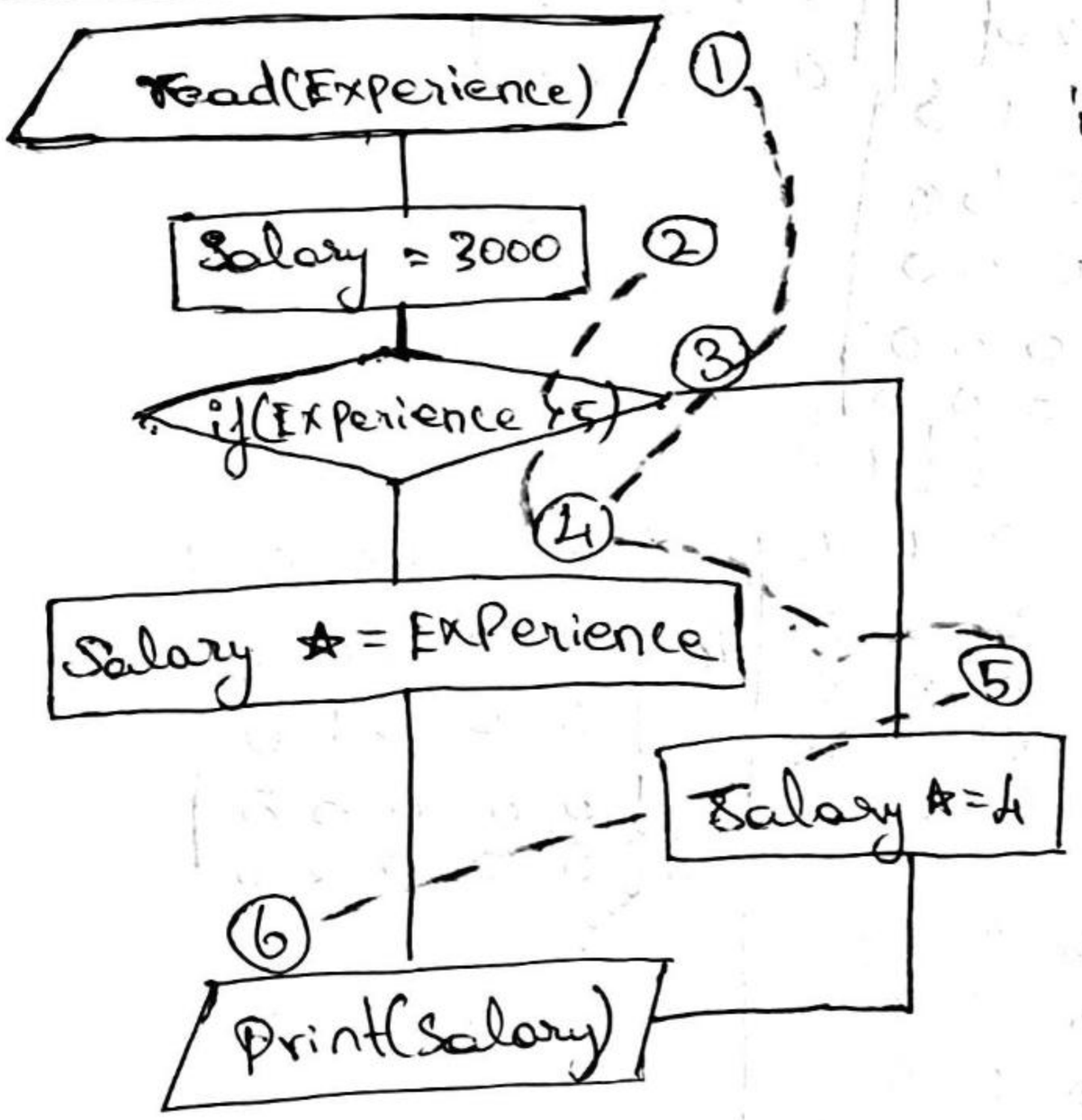
* It is a method that is used to find the test Paths of a program according to the location of definition & uses of Variables in the Program.

To illustrate the approach of data flow based testing, assume that each statement in the Program assigned a unique statement number.

* Dataflow based testing focuses on the Points at which variables receive values & the Point at which these values are Used.

Scenario: Calculating Salary of Employee

	Def	C-use	P-use
Read (Experience)	Experience		
Salary = 3000;	Salary		
if (Experience > 5)			Experience
Salary *= Experience;	Salary	Salary, Experience	
else			
Salary *= 4;	Salary	Salary	
Print (salary)		salary	



input variable

Experience

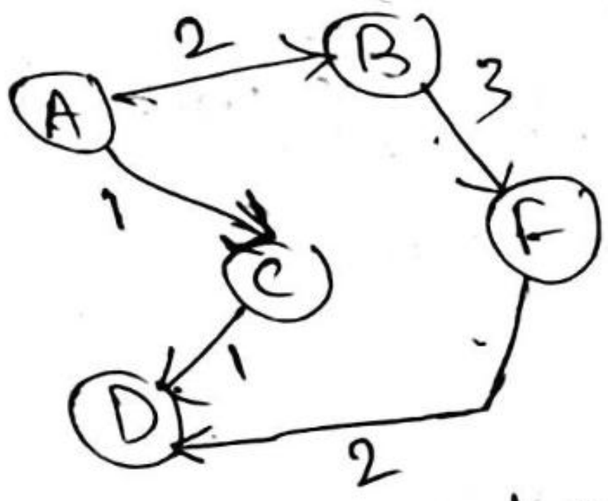
1 - 3 - 4 - 5

Other Variable

Salary

2 - 4 - 5 - 6

(2) Graph



$$A = \begin{array}{c|ccccc} & a & b & c & d & f \\ a & 0 & 2 & 1 & 0 & 0 \\ b & 0 & 0 & 0 & 0 & 3 \\ c & 0 & 0 & 0 & 1 & 0 \\ d & 0 & 0 & 0 & 0 & 0 \\ f & 0 & 0 & 0 & 2 & 0 \end{array}$$

Graph matrix:

In graph matrix based testing, we convert our flow graph into a square matrix with one row and one column for every node in the graph. If the size of graph increases it becomes difficult to do path tracing manually

2 link

Graph matrix

$$A*A = \begin{vmatrix} 0 & 2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \end{vmatrix} \times \begin{vmatrix} 0 & 2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \end{vmatrix}$$

$$A*A \Rightarrow \begin{vmatrix} 0 & 0 & 0 & 1 & 6 \\ 0 & 0 & 0 & 6 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

3 links

$$(A*A)*A = \begin{vmatrix} 0 & 0 & 0 & 1 & 6 \\ 0 & 0 & 0 & 6 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix} * \begin{vmatrix} 0 & 2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \end{vmatrix}$$

$$A^3 = \begin{vmatrix} 0 & 0 & 0 & 12 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

Connection matrix

$$A = \begin{vmatrix} 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{vmatrix} \times \begin{vmatrix} 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{vmatrix}$$

2 link

$$A^2 = \begin{vmatrix} 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

3 link

$$A^2 * A = \begin{vmatrix} 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix} * \begin{vmatrix} 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{vmatrix}$$

$$A^3 \Rightarrow \begin{vmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

Cyclomatrix

$$V(G) = e - n + 2P(P)$$

$$= 5 - 5 + 2(1)$$

$$V(G) \Rightarrow 2$$