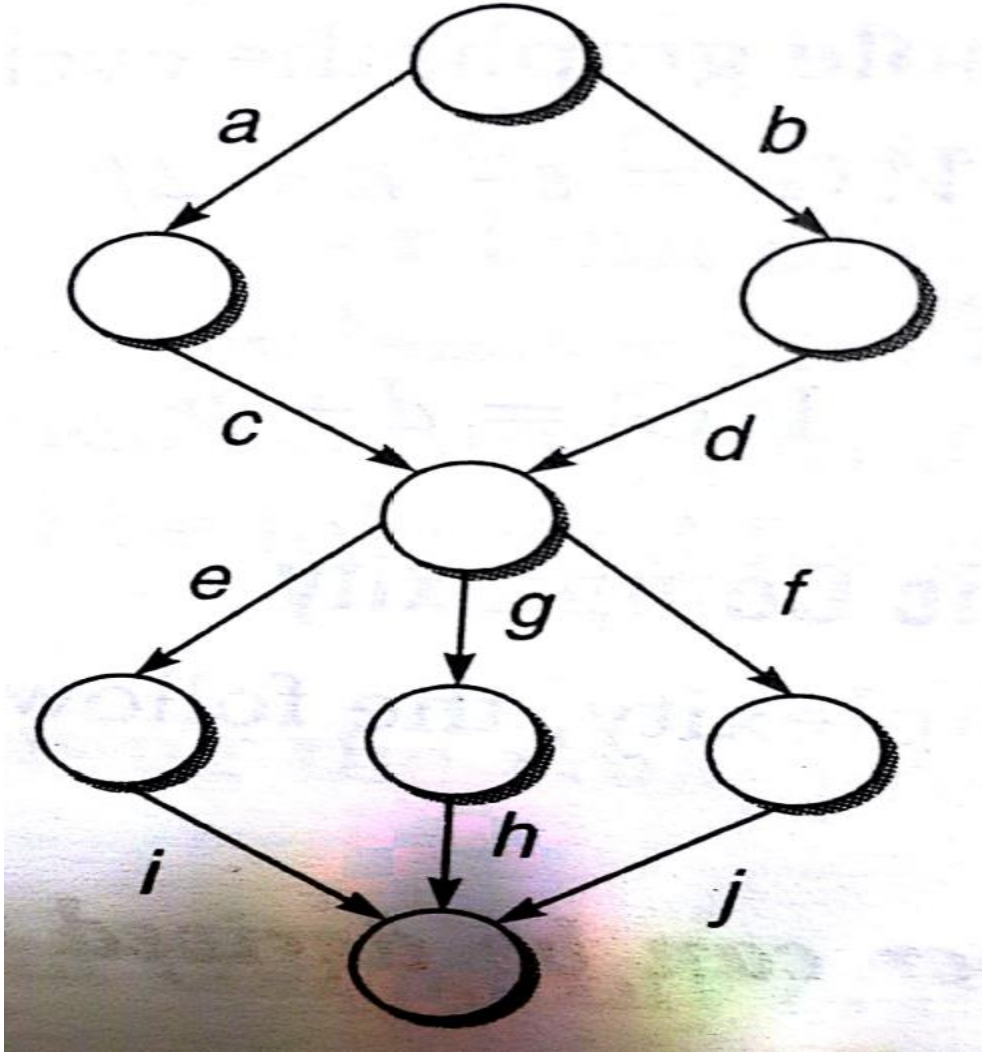
Path Testing

Definitions

- Path – A path through a program is a sequence of instructions or statements that starts at an entry , junction, or decision and ends at another, or possibly the same junction, decision or exit. A path may go through several junctions, processes, or decisions, one or more times.
- Independent path – An Independent path is any path through the graph that introduces at least one new set of processing statements or new conditions. An independent path must move along at least one edge that has not been traversed before the path is defined.
- Cyclomatic Complexity V(G) = e – n + 2

Find Independent Path



Guidelines for basis path testing

The following steps should be followed for designing test cases using path testing:

- Draw the flow graph using the code provided for which we have to write test cases.
- Determine the cyclomatic complexity of the flow graph.
- Cyclomatic complexity provides the maximum number of independent paths. Determine a basis set of independent paths through the program control structure.
- The basis set is in fact the base for designing the test cases. Based on every independent path, choose the data such that this path is executed.

```
main()
 {
     int number, index;
1.   printf("Enter the number");
2.   scanf("%d", &number);
3.   index=2;
4.   while(index <= number-1)
5.   {
6.       if(number %index ==0)
7.       {
8.           printf("Not a prime");
9.              break;
10.      }
11.      index++;
12.  }
13.  if(index==number)
14.      printf("Prime Number");
15. }
```

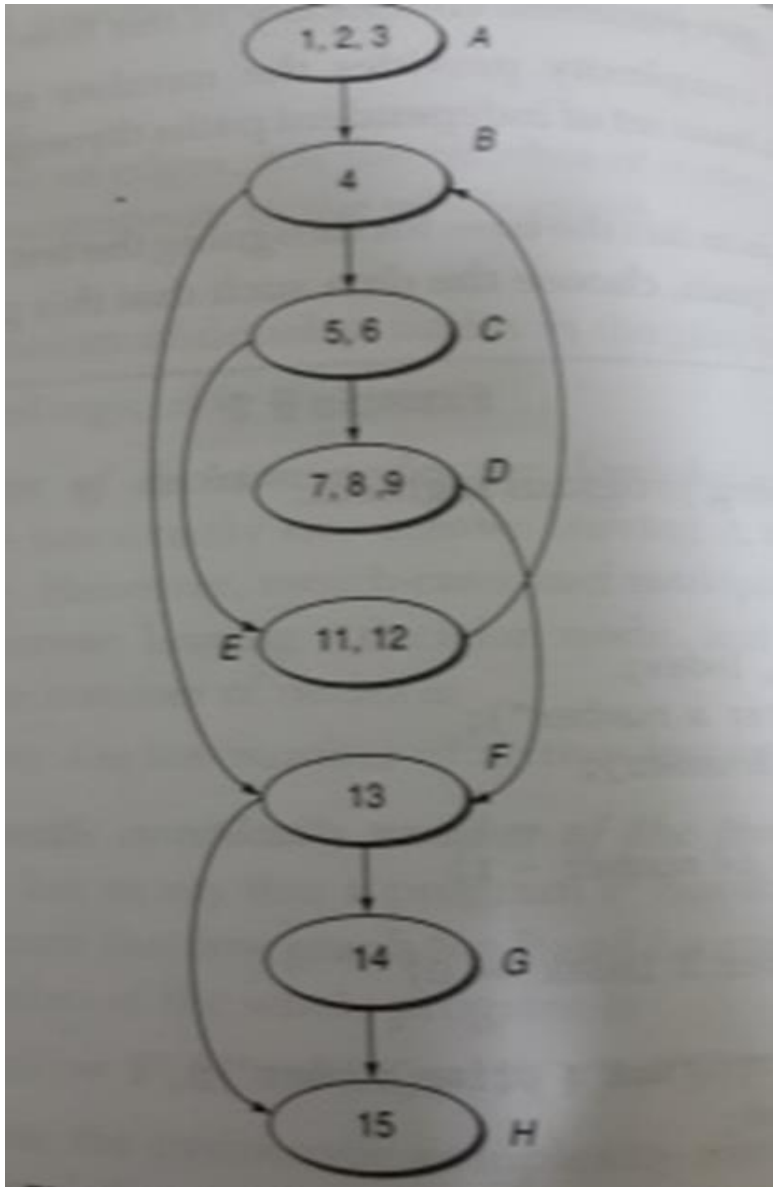


Figure 5.4 DD graph for Example 5.1

(i) A-B-F-H

(ii) A-B-F-G-H

(iii) A-B-C-E-B-F-G-H

(iv) A-B-C-D-F-H

(d) Test case design from the list of independent paths

Test case ID	Input num	Expected result	Independent paths covered by test case
1	1	No output is displayed	A-B-F-H
2	2	Prime number	A-B-F-G-H
3	4	Not a prime number	A-B-C-D-F-H
4	3	Prime number	A-B-C-E-B-F-G-H

Second Example

```
1. void main()
2. {
3.     int a,b,c,x=0, y=0;
4.     printf("Enter 3 numbers");
5.     scanf("%d %d %d",&a,&b,&c);
6.     if((a>b)&&(a>c)){
7.         x=a*a+b*b;
8.     }
9.     if(b>c){
10.        y=a*a+b*b;
11.    }
12.    printf("x = %d, y= %d", x,y);
13.    getch();
14. }
```

Third Example

```
        main()
        {
                int number;
                int fact();
1               clrscr();
2               printf("Enter the number");
3               scanf("%d",&number);
4               if(number<0)
5                       printf("invalid number");
6               else
7                       printf("%d", fact(number));
8       }

        int fact(int n)
        {
1               int p=1;
2               for(int i=1; i <=n; i++)
3                       p = p * i;
4               return p;
5       }
```