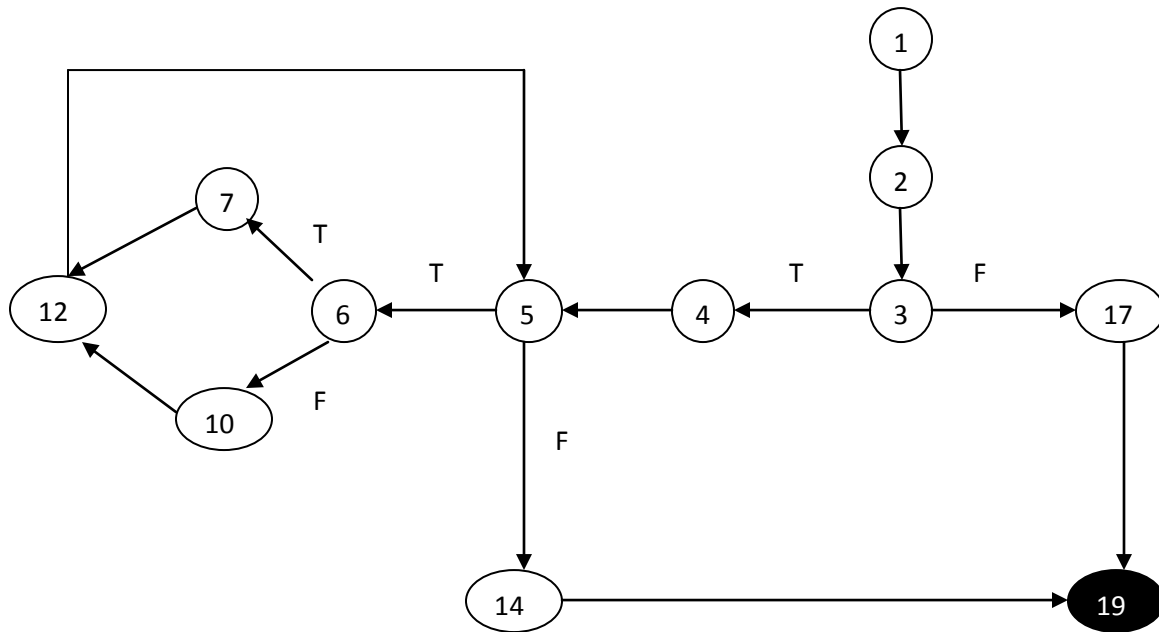


Program Graph Examples - Solutions

Problem 1:



Cyclomatic Number calculated three ways:

$$\# \text{ conditions} + 1 = 3 + 1 = 4$$

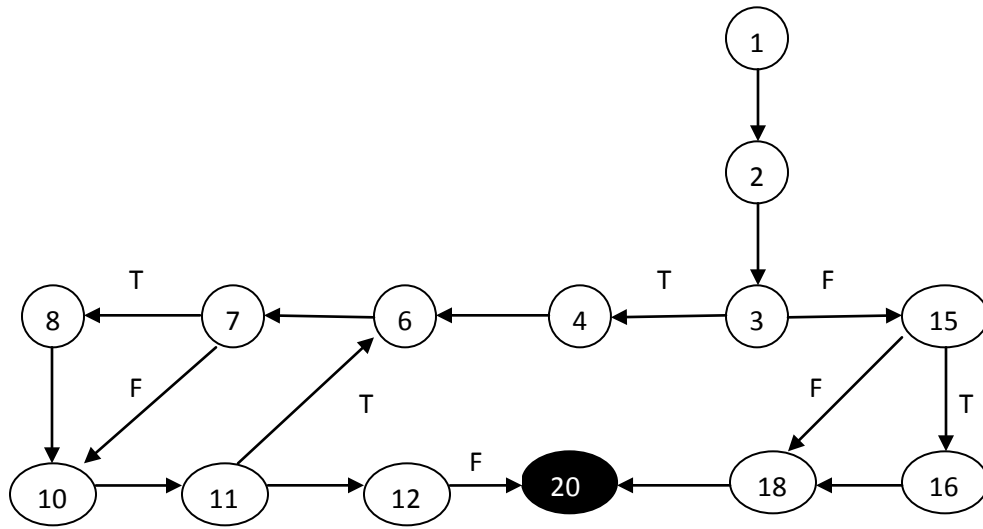
$$|E| - |V| + 2 = 14 - 12 + 2 = 4$$

$$\# \text{ Regions} + 1 = 3 + 1 = 4$$

For P^* , assume the while statement at line 5 loops exactly 4 times.

$$P^* = 1 * (((1 * (1 + 1)^4 * 1) * 1)) + 1) * 1 = 16 + 1 = 17$$

Problem 2:



Cyclomatic Number calculated three ways:

$$\# \text{ conditions} + 1 = 4 + 1 = 5$$

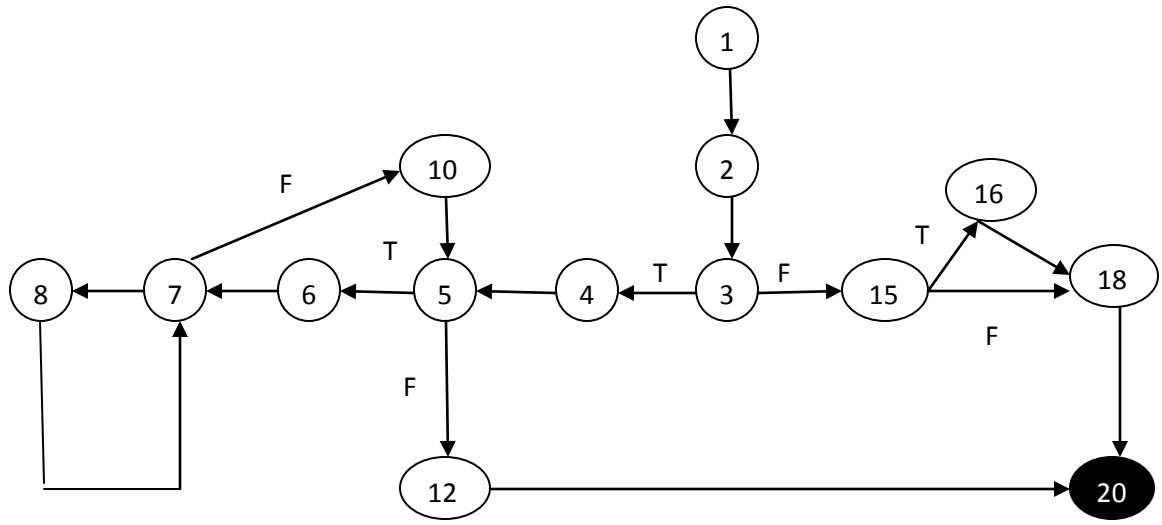
$$|E| - |V| + 2 = 17 - 14 + 2 = 5$$

$$\# \text{ Regions} + 1 = 4 + 1 = 5$$

For P^* , assume the do-while statement at line 5 loops 1, 2, or 3 times.

$$P^* = 1 * ((1 * ((1 * (1 + 1) * 1)^1 + 2^2 + 2^3) * 1) + (1 + 1)) * 1 = (2^1 + 2^2 + 2^3) + 2 = 14 + 2 = 16$$

Problem 3:



Cyclomatic Number calculated three ways:

$$\# \text{ conditions} + 1 = 4 + 1 = 5$$

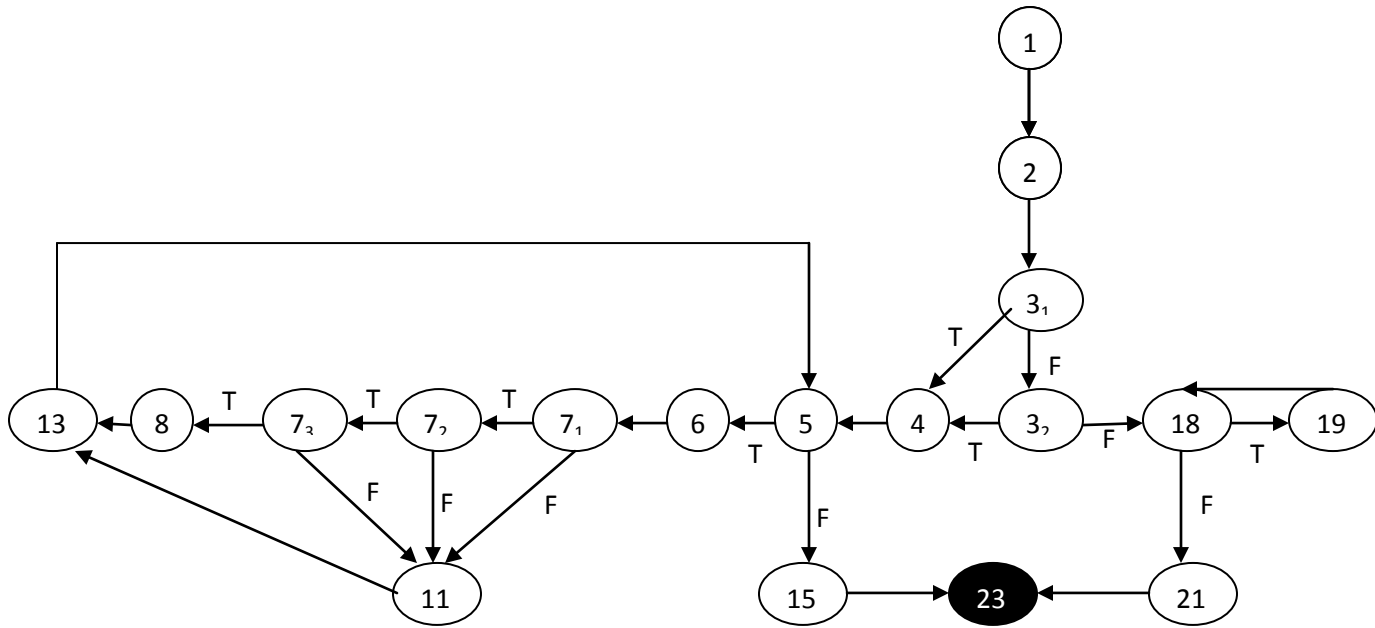
$$|E| - |V| + 2 = 17 - 14 + 2 = 5$$

$$\# \text{ Regions} + 1 = 4 + 1 = 5$$

For P^* , assume the for statement at line 5 loops 4 times and the while statement at line 7 loops 1, 2, or 3 times.

$$P^* = 1 * ((1 * (1 * (1 * (1^1 + 1^2 + 1^3) * 1)^4 * 1)) + (1 + 1) * 1) * 1 = 3^4 + 2 = 81 + 2 = 83$$

Problem 4:



Cyclomatic Number: $7 + 1 = 8$

Cyclomatic Number calculated three ways:

$$\# \text{ conditions} + 1 = 7 + 1 = 8$$

$$|E| - |V| + 2 = 24 - 18 + 2 = 8$$

$$\# \text{ Regions} + 1 = 7 + 1 = 8$$

For P^* , assume the while statement at line 5 loops 3 times and the for statement and line 18 loops exactly 24 times.

$$P^* = 1 * (2 * (1 * (1 * (3 + 1)^3 * 1)) + (1^{24} * 1)) * 1 = 2 * 64 + 1 = 129$$