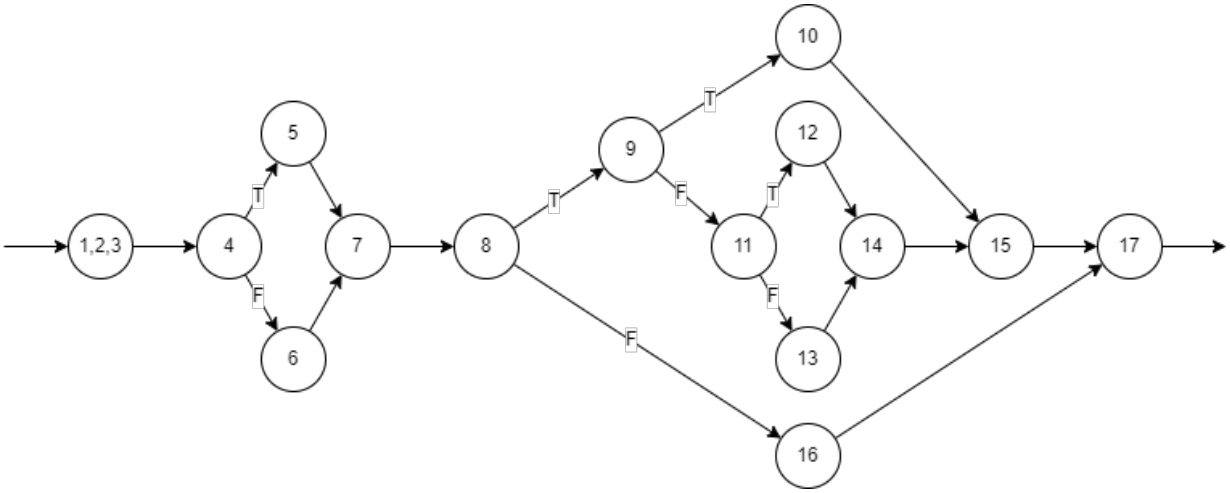
Q1

a)

The control flow graph for when compound decisions are treated *en bloc* is displayed below. Cyclomatic complexity is 5 resulting from 5 distinct regions.

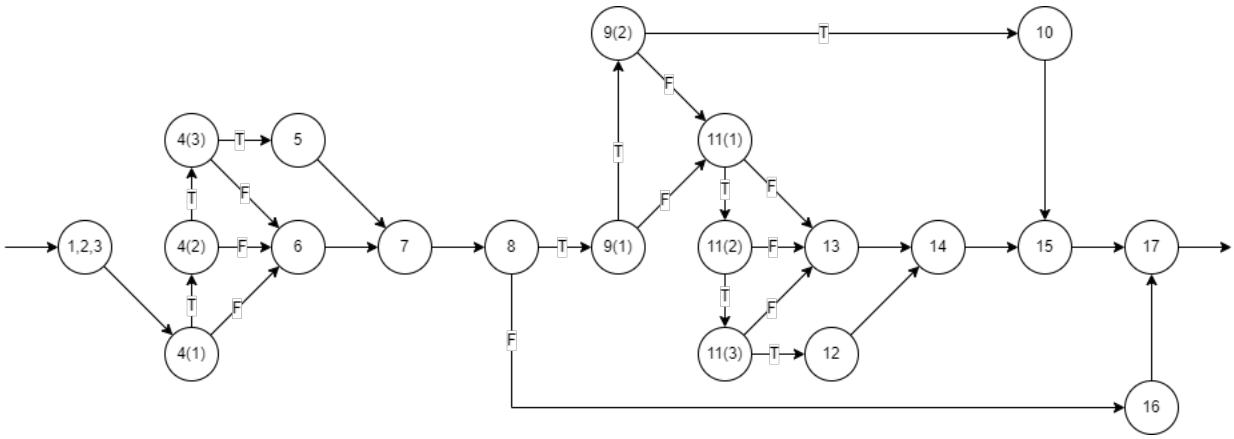
Figure 1: Control flow graph when compound decisions are treated *en bloc*.



b)

The control flow graph for when compound decisions are treated separately is displayed below. Cyclomatic complexity is 10 resulting from 10 distinct regions.

Figure 2: Control flow graph when compound decisions are treated separately.



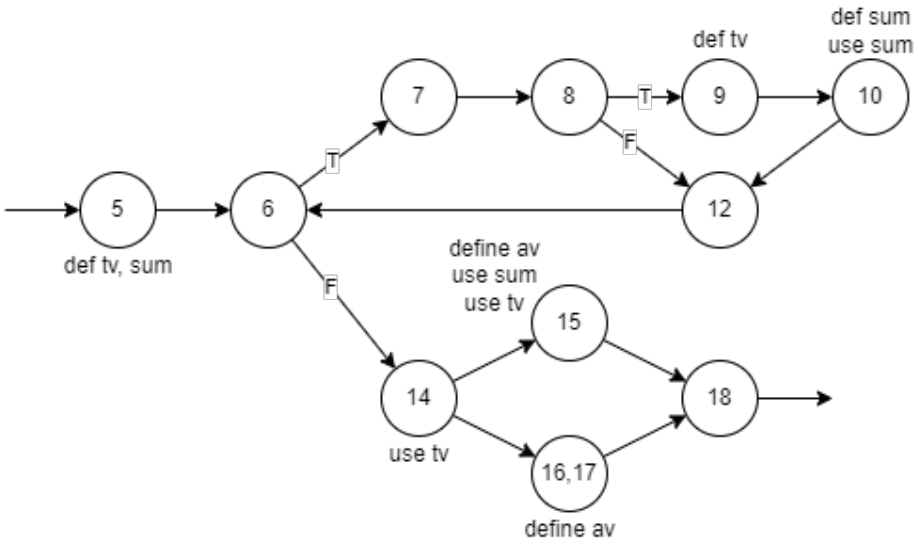
Q2

The code has been translated below. Refer to the line numbers on the left for the control flow graph.

```
1   public static double ReturnAverage(int value[],
2                                      int AS, int MIN, int MAX) {
3       int i, ti, tv, sum;
4       double av;
5       i = 0; ti = 0; tv = 0; sum = 0;
6       while (ti < AS && value[i] != -999) {
7           ti++;
8           if (value[i] >= MIN && value[i] <= MAX) {
9               tv++;
10              sum = sum + value[i];
11          }
12          i++;
13      }
14      if (tv > 0)
15          av = (double)sum / tv;
16      else
17          av = (double)-999;
18      return (av);
19  }
```

The control flow graph is displayed below.

Figure 3: Control flow graph.



Examples of *def-clear* paths are as follows:

- *tv*
  1. (5, 6, 7, 8)
  2. (9, 10, 12, 6, 14)
  3. (9, 10, 12, 6, 7, 8, 12, 6, 14)
- *av*
  1. (15, 18)
  2. (17, 18)
- *sum*
  1. (5, 6, 7, 8, 9)
  2. (10, 12, 6, 7, 8, 12, 6, 7, 8)
  3. (5, 6, 7, 8, 12, 6, 7, 8, 9)

Q3

```
1  def yeet(a):
2      x = 0
3      y = 0
4      if a < 5:
5          x = sqrt(a)
6          y = a
7      else:
8          x = a
9          y = sqrt(a)
10     return x - y
```

Q4

Table 1: Test cases for $(a||b)\&\&(\text{not}(c)||\text{not}(d))$

Test ID	a	b	c	d	Result
1	T	F	T	F	T
2	T	F	F	T	T
3	T	T	T	T	F
4	F	F	F	F	F