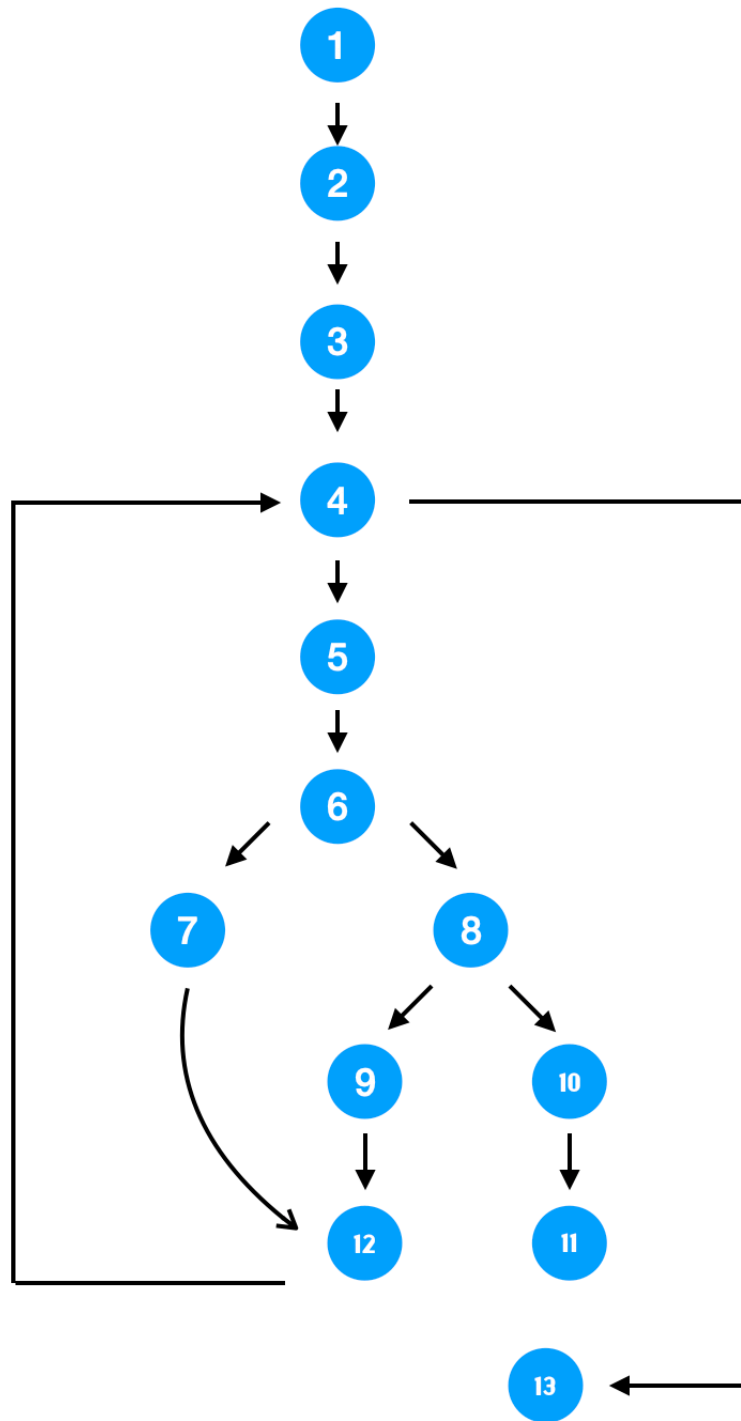


CS132 HW4 Solution

1.

a.

```
int binsearch(int X, int V[], int n){  
1   int low, high, mid;  
2   low = 0;  
3   high = n - 1;  
4   while (low <= high) {  
5       mid = (low + high)/2;  
6       if (X < V[mid])  
7           high = mid - 1;  
8       else if (X > V[mid])  
9           low = mid + 1;  
10      else  
11          return mid;  
12      }  
13      return -1;  
}
```



b.

- **1 2 3 4 5 6 8** 10 11
- **1 2 3 4 5 6 8** 9 12 4 13
- **1 2 3 4 5 6 7** 12 4 13

c.

- $X = 1 \ V = [0, 1, 2] \ n = 3 \Rightarrow 1$
- $X = 1 \ V = [0] \ n = 1 \Rightarrow -1$
- $X = -1 \ V = [0] \ n = 1 \Rightarrow -1$

2.

a.

| | a | b | c |
|---|----------|----------|----------|
| A | B/e | B/f | C/e |
| B | A/f | C/f | B/f |
| C | C/f | A/e | B/e |

b.

| test case | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| start state | A | A | A | B | B | B | C | C | C |
| input | a | b | c | a | b | c | a | b | c |
| expected output | e | f | e | f | f | f | f | e | e |
| finish state | B | B | C | A | C | B | C | A | B |
| test coverage item | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |