

Question 1

3 / 3 pts

Which of these array definitions will NOT set all the indexed variables to 0?

- ☒ `int array[5];`
- ☐ `int array[5] = {0};`
- ☐ `int array[5] = {0,0};`
- ☐ `int array[5] = {0,0,0};`
- ☐ `int array[5] = {0,0,0,0,0};`

Question 2

3 / 3 pts

Consider the array declaration:

```
int x[20];
```

There is no memory allocated for data item `x[20]`.

- ☒ True
- ☐ False

Question 3

3 / 3 pts

Which of the following statements about "call by value" and "call by reference" is incorrect?

☐

"call by value" and "call by reference" are two different ways of passing (or calling) data to functions.

☐

If data passed to a function using "call by value", then the value is only changed in the variable used inside the function.

☐

If data is passed by reference (i.e., call by reference), a memory address of the data is copied to the function. instead of the actual variable as is done in a call by value.

☒

In the call-by-value case, if the value of the data passed from a caller to a function is changed in the function, the value is also changed in the caller.

Question 4

3 / 3 pts

Which of the following is not name of a C++ library function?

☐

abs

☐

sqrt

☒

random

☐

floor

Question 5

3 / 3 pts

In a do-while loop, the **boolean expression** is executed before each execution of the loop body.

☐ True

☒ False

Question 6

3 / 3 pts

Which control construct repeats a sequence of statements zero or more times?

☒ while statement

☐ do-while statement

☐ if-elseif-else statement

☐ switch statement

☐ if-else statement

Rewrite the following `printColor()` function using switch statement.

```
01. enum Colors {  
02.     COLOR_BLACK,  
03.     COLOR_WHITE,  
04.     COLOR_RED,  
05. };  
06.  
07. void printColor(Colors color) {  
08.     if (color == COLOR_BLACK)  
09.         cout << "Black";  
10.     else if (color == COLOR_WHITE)  
11.         cout << "White";  
12.     else if (color == COLOR_RED)  
13.         cout << "Red";  
14.     else  
15.         cout << "Unknown";  
16. }
```

Your Answer:

```
void printColor(Colors color) {  
  
    switch(color) {  
  
        case COLOR_BLACK:  
            cout << "Black";  
            break;  
  
        case COLOR_WHITE:  
            cout << "White";  
            break;  
  
        case COLOR_RED:  
            cout << "Red";  
            break;  
  
        default:  
            cout << "Unknown";  
            break;  
    }  
}
```

Question 8

5 / 5 pts

Rewrite the following **do-while** loop using **for** loop.

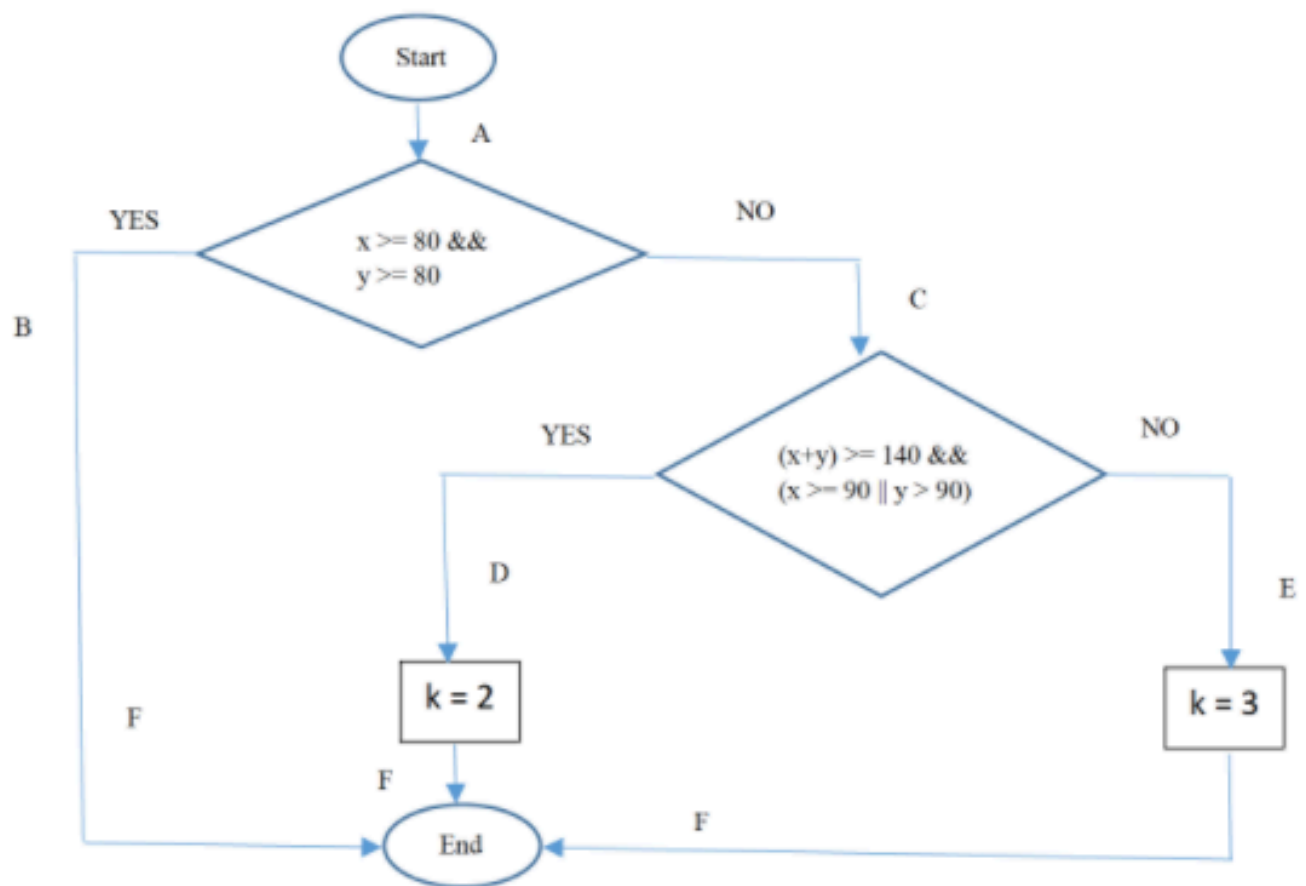
```
01.  int n = 100;
02.  do {
03.      cout << "X";
04.      n = n + 100;
05.  }
06.  while (n < 1000);
```

Your Answer:

```
for (int n = 100; n < 1000; n = n + 100) {
    cout << "X" ;
}
```

Please develop test cases (i.e., a pair of values of x and y) to implement the following six coverages.

Use this flow chart for questions Q9 - Q14.



Question 9

4 / 4 pts

Statement coverage: Every possible statement in the code should be tested at least once.

Please develop test cases for the **statement coverage**.

Your Answer:

Case 1. (F/F)

X = 80, Y = 70.

(This will take path A, C, E, and F resulting in k=3).

Case 2. (F/T)

X = 90, Y = 50.

(This will take path A, C, D, and F resulting in k=2).

Case 3. *(Though the statement has already been tested above, I'd still include it)*

X = 80, Y = 80. (T/T)

(This will take path A, B, F, with no change to variable k).

*All statements have been covered

Question 10

6 / 6 pts

Decision coverage: The true or false outcome of each decision point should be tested at least once.

Please develop test cases for the **decision coverage**.

Your Answer:

Case 1. (T/T)

X = 80, Y = 80. (T/T)

(This will take path A, B, F, with no change to variable k).

Case 2. (F/T)

X = 90, Y = 50.

(This will take path A, C, D, and F resulting in k=2).

Case 3. (F/F)

X = 80, Y = 70.

(This will take path A, C, E, and F resulting in k=3).

*All decisions have been covered.

Question 11

4 / 4 pts

Condition coverage: The true or false outcome of each Boolean expression should be tested at least once.

Please develop test cases for the **condition coverage**.

Your Answer:

Case 1. (T&T)

X = 80, Y = 80.

Case 2. (F, $x+y = T$, $x \parallel y = F$)

X = 70, Y = 90.

Case 3. (F, $x+y = T$, $x \parallel y = T$)

X = 50, Y = 91

Case 4. (F, $x + y = T$, $x \parallel y = T$)

X = 90, Y = 50

Case 5. (F, $x+y = F$, $x \parallel y = F$)

X = 50, Y = 50

Question 12

8 / 8 pts

Branch coverage: Decision coverage + Condition coverage.

Please develop test cases for the **branch coverage**.

Your Answer:

Case 1. (T&T)

X = 80, Y = 80.

Branch: YES

Case 2. (x+y = T, x || y = F)

X = 70, Y = 90.

Branches: NO, NO

Case 3. (x+y = T, x || y = T)

X = 50, Y = 91

Branches: NO, YES

Case 4. (x + y = T, x || y = T)

X = 90, Y = 50

Branches: NO, YES

Case 5. (x+y = F, x || y = F)

X = 50, Y = 50

Branches: NO, NO

*All branches have been covered

Branch condition combination coverage: All possibilities of branch condition combination should be tested at least once.

Please develop test cases for the **branch condition combination coverage**.

Your Answer:

Case 1. (T&T)

X = 80, Y = 80.

Case 2. (T&F, T & T)

X = 90, Y = 70

Case 3. (T&F, T & F)

X = 89, Y = 79

Case 4. (T&F, F & F)

X = 80, 30

Case 5. (F&T, T & T)

X = 70, Y = 91

Case 6. (F&T, T & F)

X = 60, Y = 80

Case 7. (F&T, F & F)

X = 0, Y = 80

Case 8. (F&F, F & F)

X = 0, Y = 0

Path coverage: All paths should be tested at least once.

Please develop test cases for **path coverage**.

Your Answer:

Case 1. (T&T)

X = 80, Y = 80

(Path follows A, B, F)

Case 2. (F, T)

X = 100, Y = 1.

(Path follows A, C, D, F)

Case 3. (F/F)

X = 1, Y = 1.

(Path follows A, C, E, F)

*All paths have been covered.

Black box test

A U.S. phone number consists of three sections:

1. **Area code:** It can be null or consists of three digits.
2. **Prefix code:** It consists of three digits with non-ZERO or non-ONE as the first digit in the Prefix code section. i.e. 334-123-4567 is invalid because the first digit in the Prefix code is ONE.
3. **Postfix code:** It consists of four digits.

Please list all possible test cases to expose vulnerabilities for the following three tests from questions **Q15 - Q17**.

(**Hints:** Please consider non-numeric values, such as characters)

Question 15

6 / 6 pts

Area code: It can be null or consists of three digits.

Area code test: Please list all possible test cases to expose vulnerabilities of this test.

Your Answer:

Case 1. (Correct case)

1,1,1

Case 2. (Under min entry)

1,1

Case 3. (Over max entry)

1,1,1,1

Case 4. (Null case)

null, null, null

Case 5. (Character case)

a,a,a

Prefix code: It consists of three digits with non-ZERO or non-ONE as the first digit in the Prefix code section. i.e. 334-123-4567 is invalid because the first digit in the Prefix code is ONE.

Prefix code test: Please list all possible test cases to expose vulnerabilities of this test.

Your Answer:

Case 1. (Correct Case)

9,9,9

Case 2. (Zero Case)

0,9,9

Case 3. (One Case)

1,9,9

Case 4. (Under Min Case)

9

Case 5. (Over Max Case)

9,9,9,9

Case 6. (Null Case)

null, null, null

Case 7. (Character Case)

a,a,a

Question 17

6 / 6 pts

Postfix code: It consists of four digits.

Postfix code test: Please list all possible test cases to expose vulnerabilities of this test.

Your Answer:

Case 1. (Correct Case).

1,2,3,4

Case 2. (Under Min Case)

1,2,3

Case 3. (Over Max Case)

1,2,3,4,5

Case 4. (Null Case)

null, null, null. null

Case 5. (Character Case)

a,a,a,a