

CFG Practice Problems – CSE470 Quiz 4 Prep

Problem 1 – Simple If-Else

Code:

```
int x = 5;
if (x > 0) {
    x = x + 1;
} else {
    x = x - 1;
}
printf("%d", x);
```

Analysis:

Cyclomatic Complexity = $2 + 1 = 3$

Predicate Nodes: 1 (if)

Basic Paths:

1. [1 -> 2 -> 4 -> 6]
2. [1 -> 3 -> 5 -> 6]

Problem 2 – If inside While Loop

Code:

```
int i = 0;
while (i < 3) {
    if (i % 2 == 0)
        printf("Even\n");
    else
        printf("Odd\n");
    i++;
}
printf("Done\n");
```

Analysis:

Cyclomatic Complexity = 3
Predicate Nodes: 2 (while, if)
Basic Paths:
1. Loop never enters
2. $i \% 2 == 0$ path
3. $i \% 2 != 0$ path

Problem 3 – Nested Loops

Code:

```
for (int i = 0; i < 2; i++) {  
    for (int j = 0; j < 2; j++) {  
        printf("%d %d\n", i, j);  
    }  
}  
printf("End\n");
```

Analysis:

Cyclomatic Complexity = 3
Predicate Nodes: 2 (two for-loops)

Problem 4 – Loop with Continue and Break

Code:

```
for (int i = 0; i < 5; i++) {  
    if (i == 2) continue;  
    if (i == 4) break;  
    printf("%d\n", i);  
}  
printf("Bye\n");
```

Analysis:

Cyclomatic Complexity = 4
Predicate Nodes: 3 (loop + 2 ifs)

Problem 5 – While + Nested If-Else If

Code:

```
int x = 0;
while (x < 3) {
    if (x == 0)
        printf("Zero\n");
    else if (x == 1)
        printf("One\n");
    else
        printf("Other\n");
    x++;
}
printf("Loop finished\n");
```

Analysis:

Cyclomatic Complexity = 4

Predicate Nodes: 3 (while + if + else if)

Hard Problem 1 – Nested For + Mixed Conditions

Code:

```
int yes = 0;
int no = 0;

for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 2; j++) {
        if (i == j) {
            yes++;
        } else if (j == 1) {
            no++;
        }
    }
}

printf("Yes: %d\n", yes);
printf("No: %d\n", no);
```

Analysis:

Cyclomatic Complexity = 5

Predicate Nodes: 4 (2 for-loops + if + else-if)

Hard Problem 2 – While + Continue + Ifs

Code:

```
int i = 0;
while (i < 4) {
    if (i == 2) {
        i++;
        continue;
    }
    if (i % 2 == 0) {
        printf("Even\n");
    } else {
        printf("Odd\n");
    }
    i++;
}
printf("Done\n");
```

Analysis:

Cyclomatic Complexity = 5

Predicate Nodes: 3 (while + 2 ifs)