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HW2

Problem 1:

1. Call graph:

A close up of a check pass

Description automatically generated

1. ICFG:

A diagram of a flowchart

Description automatically generated

1. Realizable Path 1:
2. Start at the main function (line 20)
3. Initialize marks to 30 (line 21)
4. Enter while loop (line 22)
5. Call check\_pass(marks) (line 23) which will return false because marks(30) is less than 80.
6. Increment marks by 1 (line 24), marks now equals 31
7. Reiterate the while loop
8. Continue incrementing marks by 1 in each iteration of the loop until marks reaches 80
9. On the iteration where marks becomes 80, check\_pass(marks) will return true (line 12)
10. Exit the loop

Realizable Path 2:

1. Start at main (line 20)
2. Initialize marks to 30 (line 21)
3. Enter while loop (line 22)
4. Call check\_pass(marks) (line 23), which will return false because marks(30) is less than 80
5. Increment marks by 1 (line 24), marks now equals 31
6. Reiterate the while loop
7. Continue incrementing marks by 1 in each iteration of the loop until marks becomes greater than or equal to 90
8. After exiting the while loop, increment marks by 50 (line 26) making marks 140
9. Call check\_pass(marks) (line 27) which returns false since check\_limit(marks) (line 8) returns false
10. Exit main
11. The infeasible path is the lines 15-17. In the check\_pass function, there are three possible return points: 1) if the marks are greater than or equal to 80, it returns true on line 12. 2) if the marks are less than 80, it returns false on line 14, 3) if none of the previously mentioned conditions are met, it reaches line 16. Lines 16-17 will never be reached because the main function sets marks to be 30 and after running through feasible paths, it will be checked by the if else if statements in lines 11-14. So, lines 16-17 are infeasible and can never be executed.