

Software Testing and Reliability

Xiaoyuan Xie 谢晓园

xxie@whu.edu.cn

计算机学院E301

Lecture 9

Quiz 1

```

BEGIN
INPUT A, B, C
IF (A=0)
    IF (B=0)
        IF (C=0)
            OUTPUT ("X can be any value.")
        ELSE
            OUTPUT ("There is no solution for X.")
    ELSE
        IF (C=0)
            X = 0
        ELSE
            X = -C/B
    ELSE
        IF (B=0)
            IF (C=0)
                X = 0
            ELSE
                IF (A*C<0)
                    X = SQRT(-C/A) or X = -SQRT(-C/A)
                ELSE
                    OUTPUT ("There is no real solution for X.")
            ELSE
                IF (C=0)
                    X = 0 or X = -B/A
                ELSE
                    D = B*B-4*A*C
                    IF (D>0)
                        X = (-B+SQRT(D))/(2*A) or X = (-B-SQRT(D))/(2*A)
                    ELSE IF (D=0)
                        X = -B/(2*A)
                    ELSE
                        OUTPUT ("There is no real solution for X.")
                END
            END
        END
    END
END

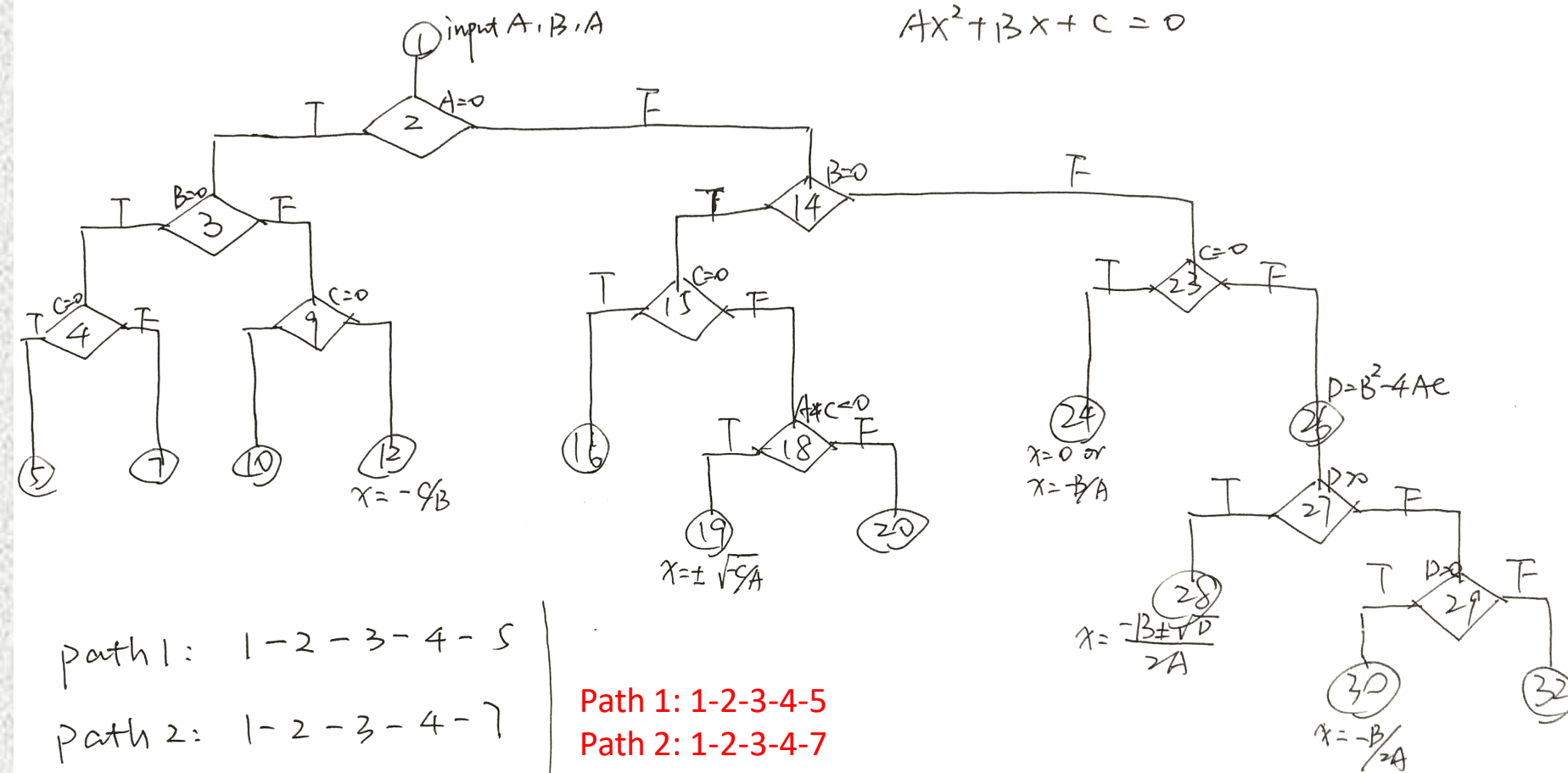
```

(1) Draw the control flow graph for this program; (1 marks)

(2) Generate three test suits to satisfy statement coverage, branch coverage, and path coverage. Compare the three test suites, in terms of their elements and sizes; (12 marks)

(3) Identify all def-use pairs for variables A , B and C , then generate test cases that execute all these def-use pairs. (12 marks)

$$Ax^2 + Bx + C = 0$$



path 1: 1-2-3-4-5

path 2: 1-2-3-4-7

path 3:

Path 1: 1-2-3-4-5

Path 2: 1-2-3-4-7

Path 3: 1-2-3-9-10

Path 4: 1-2-3-9-12

Path 5: 1-2-14-15-16

Path 6: 1-2-14-15-18-19

Path 7: 1-2-14-15-18-20

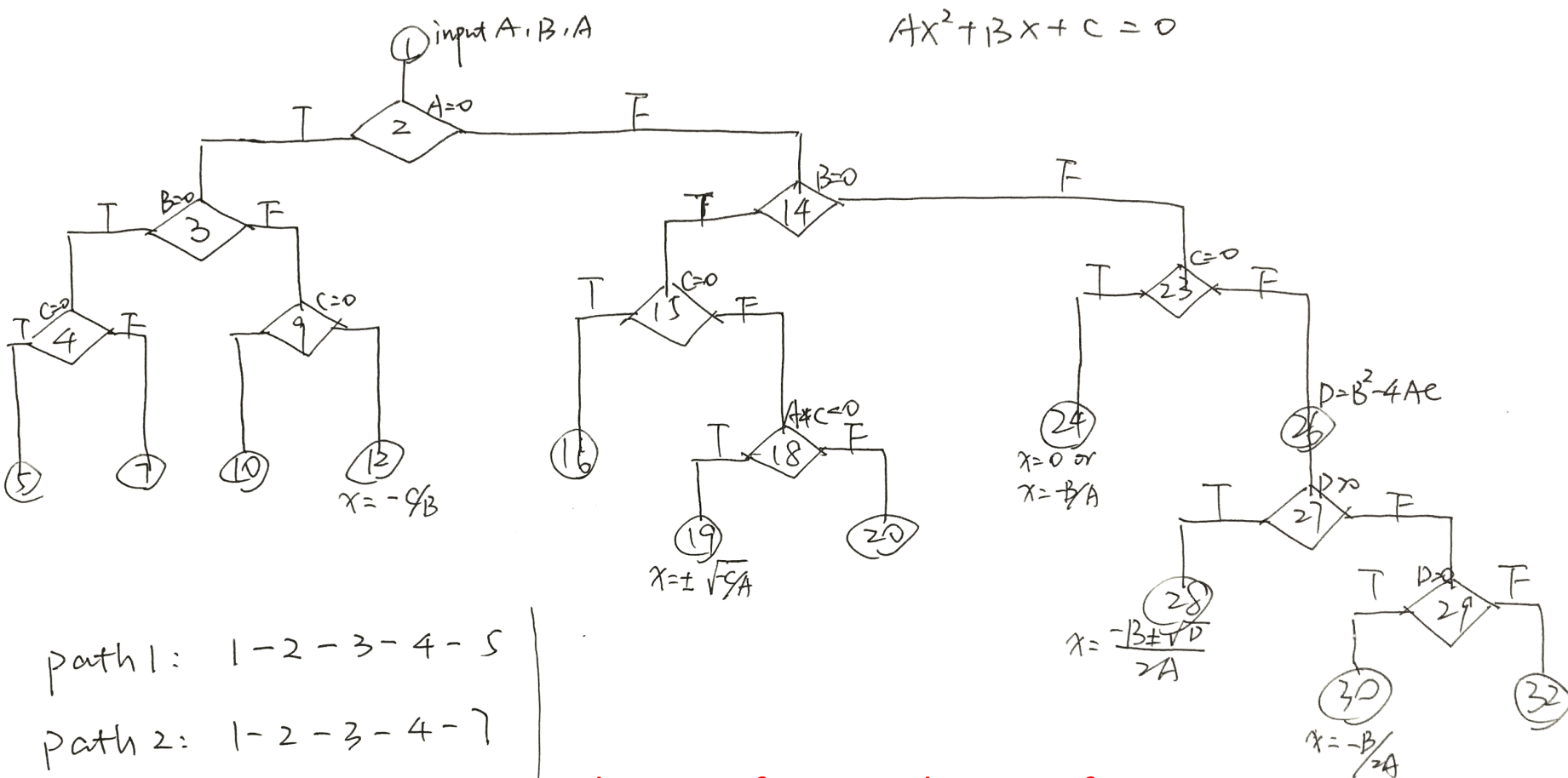
Path 8: 1-2-14-23-24

Path 9: 1-2-14-23-26-27-28

Path 10: 1-2-14-23-26-27-29-30

Path 11: 1-2-14-23-26-27-29-32

No difference between path coverage, branch coverage and statement coverage?



path 1: 1-2-3-4-5

path 2: 1-2-3-4-7

path 3:

d-u pairs for A

- (1, 2)
- (1, 18)
- (1, 19)
- (1, 24)
- (1, 26)
- (1, 28)
- (1, 30)

d-u pairs for B

- (1, 3)
- (1, 12)
- (1, 14)
- (1, 24)
- (1, 26)
- (1, 28)
- (1, 30)

d-u pairs for C

- (1, 4)
- (1, 9)
- (1, 12)
- (1, 15)
- (1, 18)
- (1, 19)
- (1, 23)
- (1, 26)