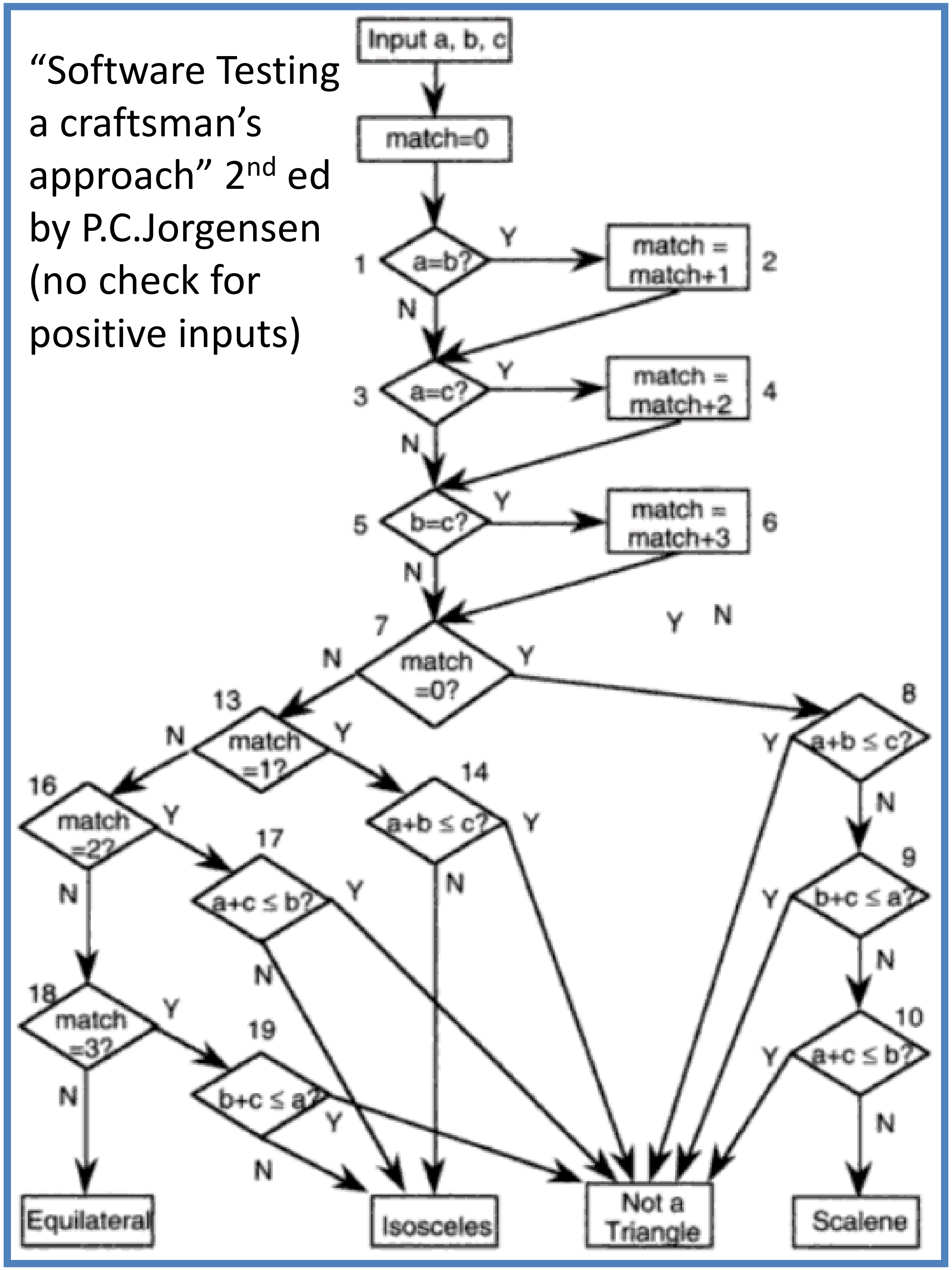
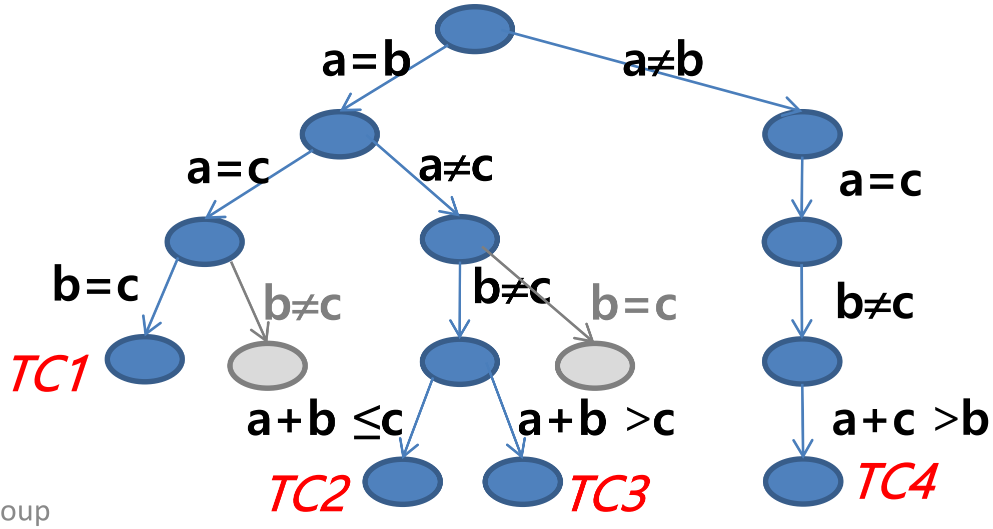
HW6

1. Describe test cases to reach full path coverage of the triangle program shown in CFG by completing the path condition table below.
   Also, draw the complete execution tree showing executed path conditions (50pts)
   - Assume that the initial test case is given as 1,1,1
   - You should use the DFS algorithm
   - Note that CREST uses *reverse*-dfs search heuristics. Thus, your solutions will be different from what CREST generated



"Software Testing a craftsman's approach" 2nd ed by P.C.Jorgensen (no check for positive inputs)

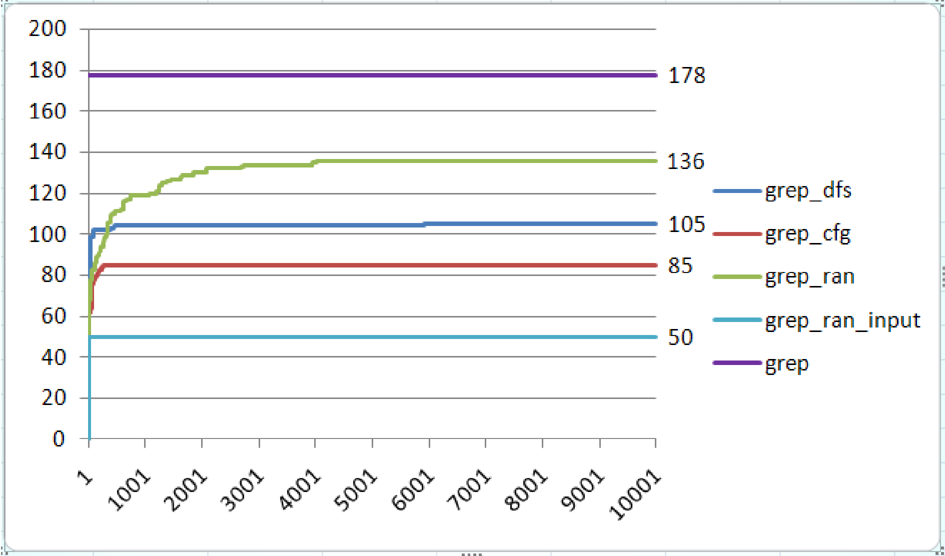
Test case	Input (a,b,c)	Executed path conditions (PC)	Next PC	Solution for the next PC
1	1,1,1	$a=b \wedge a=c \wedge b=c$	$a=b \wedge a=c \wedge b \neq c$	Unsat
			$a=b \wedge a \neq c$	1,1,2
2	1,1,2	$a=b \wedge a \neq c \wedge b \neq c \wedge a+b \leq c$	$a=b \wedge a \neq c \wedge b \neq c \wedge a+b > c$	2,2,3
3	2,2,3	$a=b \wedge a \neq c \wedge b \neq c \wedge a+b > c$	$a=b \wedge a \neq c \wedge b=c$	Unsat
			$a \neq b$	2,1,2
4	2,1,2	$a \neq b \wedge a=c \wedge b \neq c \wedge a+c > b$	$a \neq b \wedge a=c \wedge b \neq c \wedge a+c \leq b$	2,5,2



2. Testing grep.c (100 pts)

- Generate test cases using CREST for grep. You are requested to modify grep.c to create test cases through CREST. You should report the following items carefully:
  1. Describe which variables are declared symbolically and how
     - How long is a target pattern, a target file, options, etc
  2. Describe how you modified the target code to improve branch coverage
  3. Create 10,000 test cases per each of the 4 different search strategies - dfs, random, cfg, hybrid
  4. Measure the final branch coverage (i.e., condition coverage in the original target program) reported by CREST
     - You should report the branch coverage per search strategy
       - You can do this by analyzing branch and coverage output file
     - Also draw 4 coverage increase graphs for all 4 search strategy

(option) The persons who achieve the best, 2nd best coverage will get **<u>extra 100 points</u>**.


grep_dfs
grep_cfg
grep_ran
grep_ran_input
grep