



PMSCS Program
Department of Computer Science and Engineering
Jahangirnagar University
Final Examination: Fall-2021

Answer Script

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Course Information

Course Title:	Software Testing		
Course Code:	PMSCS-670	Marks:	30

Instructions

1. Be present in the corresponding classroom at least 15 minutes prior.
 2. Any form of unfair means or cheating (verbal communication, visual copying, unauthorized chit etc.) is a punishable offense.
 3. You will not be allowed to use additional sheets. Limit your answer so that it fits within the allocated space.
 4. Scan the whole answer script and turn in through Google Classroom.
 5. Failing to upload the answer script within the given time span will be considered as disqualification.

Student Information

Full Name:	A R I K M D I S T H I A Q U E						
Class Roll:	C S E 2 0 2 1 0 2 0 2 4						
Date:	2 5 - 0 2 - 2 0 2 2						

Office Use Only

<u>Questions</u>	<u>Marks</u>	<u>Remarks</u>
1.		
2.		
3.		
4.		
Total		

Principles of software testing: The seven software testing principles are -

- ① testing shows presence of defects
- ② Exhaustive testing is not possible
- ③ Early testing reduce time & cost
- ④ Pesticide paradox
- ⑤ Defect clustering
- ⑥ testing is context dependent
- ⑦ Absence of error-fallacy

Answer to the question number 1(b):

Advantage of criteria based test

design :

- ① Maximize efficiency by with fewer test case
- ② provide trackability of software test
- ③ Regression testing is easier
- ④ stopping rule can be defined
- ⑤ powerfull tools are available for support.

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Answer to the question number 1(b):



Answer to the question number 1(c):

Beta testing: It is a formal type of software testing that is done by the end-customer in the real environment before releasing the product to the market for the actual end-users. It ensures that there is no major failures in the software or product and it satisfies the business requirements.

Functional vs Non-functional testing:

Here is the comparison between functional and non-functional testing:

Answer to the question number 1(c):Functional testing

① it verifies the features of the software

② it can be done manually

③ it done based on customer demand.

④ its goal to validate software action

⑤ it describe what the product does

Non-functional testing

① it verifies performance, usability of the software

② it is hard to do manually

③ it done based on customer expectation

④ its goal validate software performance

⑤ it describe how the product works

Answer to the question number 1(d):

Block diagram of MSTD steps

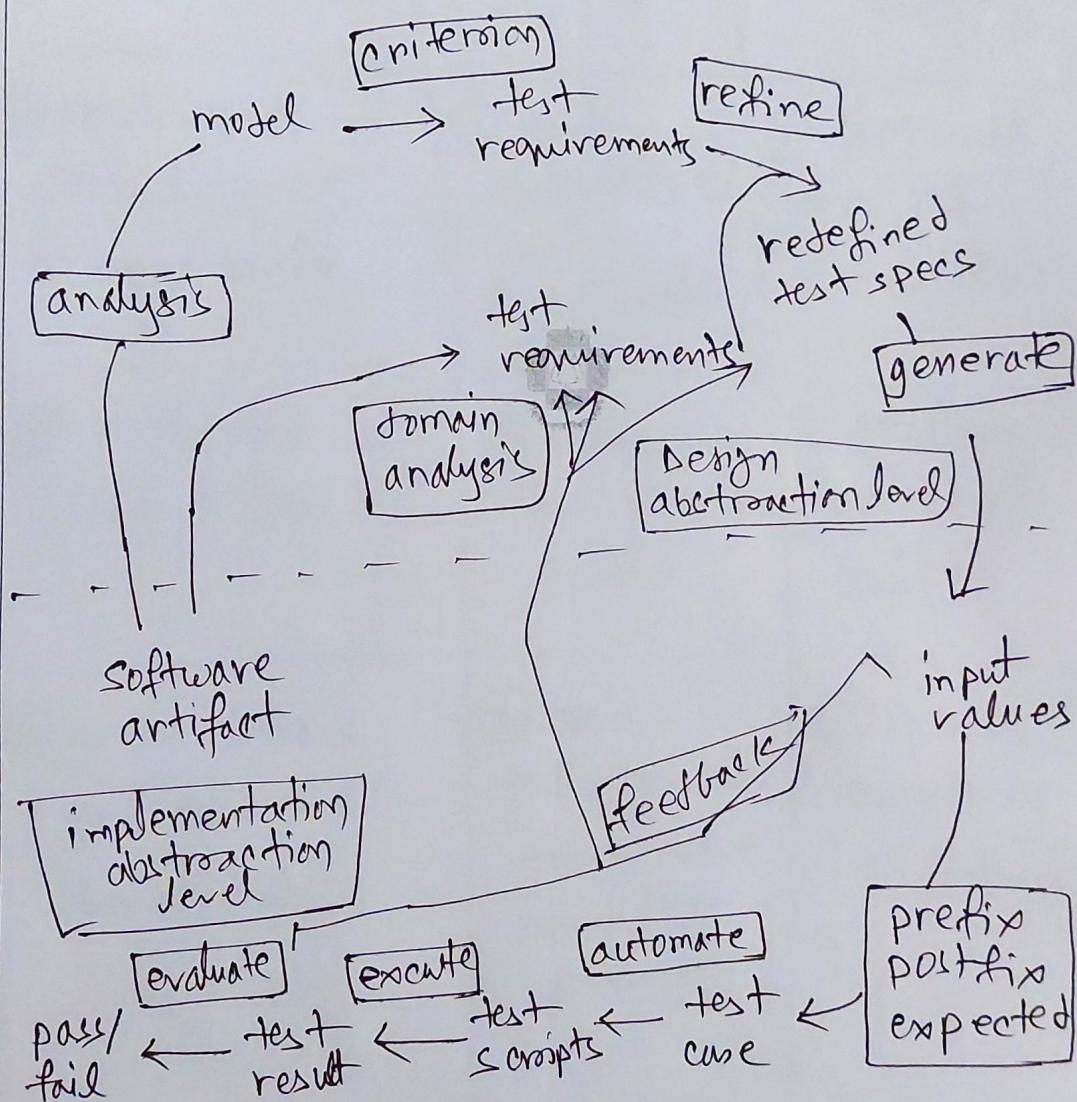


fig: Block diagram of MSTD steps

Answer to the question number 1(d):

Comparison between smoke, sanity
and Regression testing: ~~are~~

Smoke testing	sanity testing	Regression testing
① test the stability of a new built	① test stability of new functionality	① test all areas of functionality
② performed on initial build	② performed on stable build	② performed on stable build
③ cover basic end-to-end functionality	③ covers only modules that have been changed	③ covers everything in details.

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Answer to the question number 1(d):

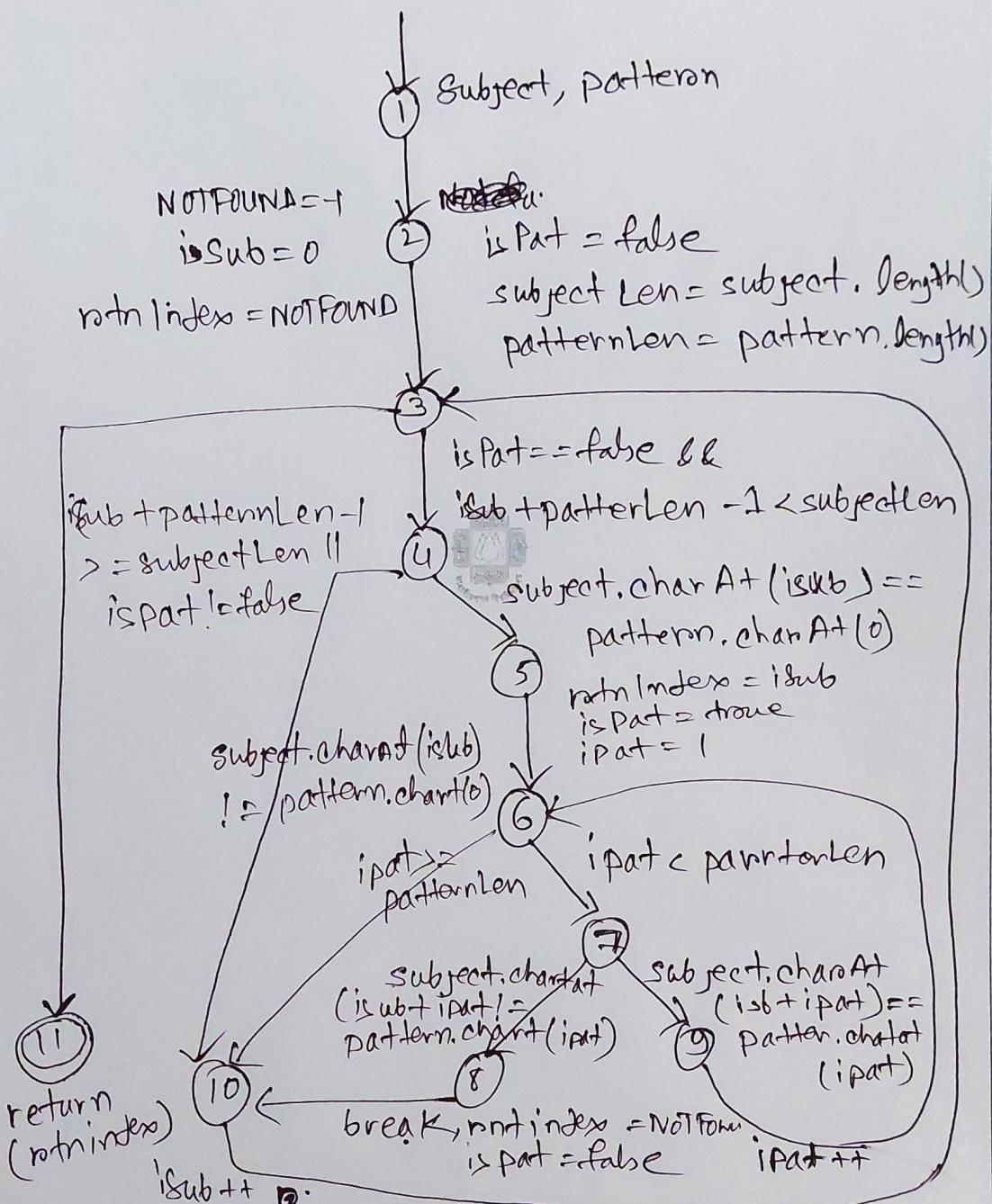


Answer to the question number 2(a):

Criteria Subsumption: A test criterion

C_1 subsumes ~~C_2~~ criterion C_2 if
and only if every set of test
cases that satisfies criterion C_1 also
satisfies criterion C_2 must be
true for every set of test cases.

DU-Path: DU-path is a simple
subpath that is def-clear with ~~to~~
~~respect to~~ from a def of
 x to a use of x .

Answer to the question number 2(b):Data flow graph of code-segment 1 :

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Answer to the question number 2(b):



Answer to the question number 2(c):

EPC criteria for the Code-Segment1 derived graph :

$TR = \{ [1, 2, 3], [2, 3, 4], [2, 3, 11], [3, 4, 10],$
 $[3, 4, 5], [4, 10, 3], [4, 5, 6], [5, 6, 10],$
 $[5, 6, 7], [6, 10, 3], [6, 7, 8], [6, 7, 9],$
 $[7, 8, 10], [7, 9, 6], [8, 10, 3], [9, 6, 10],$
 $[9, 6, 7], [9, 6, 5], [10, 3, 11], \}$

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Answer to the question number 2(c):



Answer to the question number 2(d):

DU-path from Code-Segment - 1

for isPat:

$$\text{du}(2, \text{isPat}) = [2, 3, 4], \\ [2, 3, 11]$$

$$\text{du}(5, \text{isPat}) = [5, 6, 10, 3, 4], \\ [5, 6, 10, 3, 11]$$

$$\text{du}(8, \text{isPat}) = [8, 10, 3, 4], [8, 10, 3, 11]$$

for rtmIndex:

$$\text{du}(2, \text{rtmIndex}) = [2, 3, 11]$$

$$\text{du}(5, \text{rtmIndex}) = [5, 6, 10, 3, 11]$$

$$\text{du}(8, \text{rtmIndex}) = [8, 10, 3, 11]$$

Answer to the question number 2(d):

for iSub :

$$\text{du}(2, \text{iSub}) = [2, 3, 4], [2, 3, 4, 5], \\ [2, 3, 4, 5, 6, 7, 8], \\ [2, 3, 4, 5, 6, 7, 9], \\ [2, 3, 4, 5, 6, 10] \\ [2, 3, 4, 5, 6, 7, 8, 10], \\ [2, 3, 4, 10], \\ [2, 3, 11]$$

$$\text{du}(10, \text{iSub}) = [10, 3, 11], [10, 3, 4], \\ [10, 3, 4, 10], \\ [10, 3, 4, 5], \\ [10, 3, 4, 5, 6, 7, 8, 10], \\ [10, 3, 4, 5, 6, 7, 8], \\ [10, 3, 4, 5, 6, 7, 9], \\ [10, 3, 4, 5, 6, 10]$$

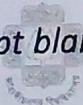
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Answer to the question number 3(a):

In predicate coverage, each predicate must be evaluates true ones and must be evaluates false ones. In the clause coverage each clause must be evaluates true ones and each clause evaluates false ones.

 predicate coverage can subsume clause coverage.

Example: $P = ab$

Here, we can see that if we cover the predicate coverage it will automatically cover the clause coverage.

a	b	ab
T	T	T
T	F	T
F	T	T
F	F	F

Answer to the question number 3(b):

Base Choice Coverage: A base choice coverage is chosen for each ~~prop~~ & characteristics from each block and a base base test is formed by using the base choice for each block.

Here, Number of  test is one best test + one test for each other block.

$$\therefore BCC = 1 + \sum_{i=1}^n (B_i - 1)$$

Answer to the question number 3(b):

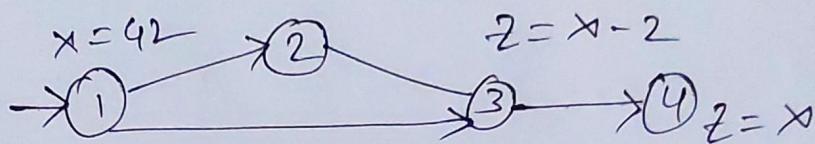
Constraints of ISP characteristics:

There are two general type of constraints -

- ① A block from one characteristics can not be combined with a specific block from another.
- ② A block from one characteristics can ~~at~~ only be combined with a specific block from another characteristics.

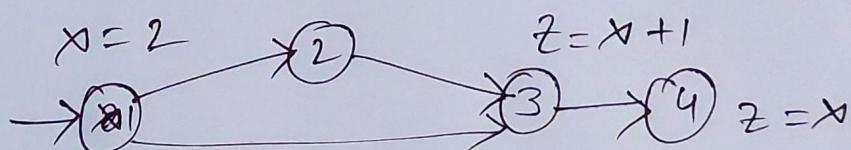
Answer to the question number 3(c):

Def: A location where a value for a variable is stored into memory



Here, $\text{def}(x) = \{ \text{~~1, 2, 3~~} \mid 1 \}$

Use: A location where a variable's value is accessed.



Here, $\text{use}(x) = \{ 3, 4 \}$

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Answer to the question number 3(c):



Answer to the question number 3(d):

Edge pair coverage of fig: 1

$$TR = \{ [1, 2, 4], [2, 1, 3, 4], [3, 6, 5, 7], \\ [3, 5, 6], [5, 6, 3], [6, 3, 4] \}$$

Prime path coverage of fig: 1

1	1, 2	1, 2, 4	1, 3, 5, 7
2	1, 3	1, 3, 4	1, 3, 5, 6
3	2, 4	3, 5, 7	3, 5, 6, 4
4	3, 4	3, 5, 6	3, 5, 6, 4
5	3, 5	5, 6, 3	3, 5, 6, 4
6	5, 7	6, 3, 4	
7	5, 6		
	6, 3		

$$TR = \{ [1, 2, 4], [1, 3, 4], [5, 6, 3], [6, 3, 4], \\ [1, 2, 3, 5, 7], [1, 3, 5, 6], [3, 5, 6, 4] \}$$

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Answer to the question number 3(d):



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Answer to the question number 4(a):



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Answer to the question number 4(a):



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Answer to the question number 4(b):



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Answer to the question number 4(b):



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Answer to the question number 4(c):



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Answer to the question number 4(c):



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Answer to the question number 4(d):

