

Day: _____ After Mids Date: _____

19-3-24

Week 10

Tuesday

Software Metrics:

Measure Measurement Metrics
↓ ↓
km, m measure of km,
 m is called
 measurement

Define:

Metrics is the sum of two or more measure or measurement.

km → measure

10 km → measurement

10 km per hour → Metrics

Detects → measure

100 detects → measurement

100 detects per kLC → Metric

5 liter milk per day → Metric

Availability: (Non-Functional Req)

A software is 10 days old.

tell us how many days the software worked well without any error.

Mean time to failure = 8

↓ worked perfectly

Mean time to repair = 2

↓ time taken to repair it

$$d = \frac{MTTF}{MTTF + MTTR} = \frac{8}{2} = 4$$

Availability of 1

Repair time

100% availability when Repair time is zero

Availability of MTTF

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Maintainability:

for this purpose we use
MTTC (mean time to change)
metrics.

$$\text{Maintainability} \propto \frac{1}{\text{MTTC}}$$

Correctness:

How well a software performs
is required function.

$$\text{Defect Density} = \frac{\text{no. of defects}}{\text{size of program in kLOC}}$$

$$\text{Defect density} = \frac{5}{5 \text{ kLOC}} = 1 \text{ / kLOC}$$

Usability:

Usability is measured by feedback.

Integrity:

refers to attack

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$$\text{Integrity} = \frac{\text{no. of successful attempt}}{\text{total no. of attempt}} \times 100$$

So 1. integrity means :-

↳ If attack is 50 & if 35
then good Hack

↳ If attack is 25 & if 25
then good Hack

Performance :

system respond to an event occur.

latency :- respond time

throughput :- in a second

unit of throughput = minute

throughput = 10

60 = ~~6~~ sec.

10

Jitter :- 1st time delay - 2nd time delay

8 - 6

Calculated Metrics

Process Metric

Product Metric

- test case tracking metrics
- test case preparation productivity
- test design coverage
- test execution coverage
- test execution productivity
- * - test effectiveness

a person is fired on the base of
test effectiveness.

$$\text{test effectiveness} = \frac{\text{no. of defects found in test}}{\text{no. of defects found in test} + \text{no. of defects found after shipping}} \times 100\%$$

$$= \frac{100}{100+200} \times 100\% = 33.3\%$$

Day:

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22-03-24

Week 10

Friday

Cyclomatic Complexity :-

$$V(G) = E - N + 2$$

where E edges N nodes

--- (out << "Hello" . ①)

while (value[i] != -999 $\&\&$ i < 100) ②

i++; ③

if (value[i] \geq min $\&\&$ value[i] \leq max) ④ ⑤

 tovalue++;
 sum = sum + valid[i]] ⑥

}

i++; ⑦

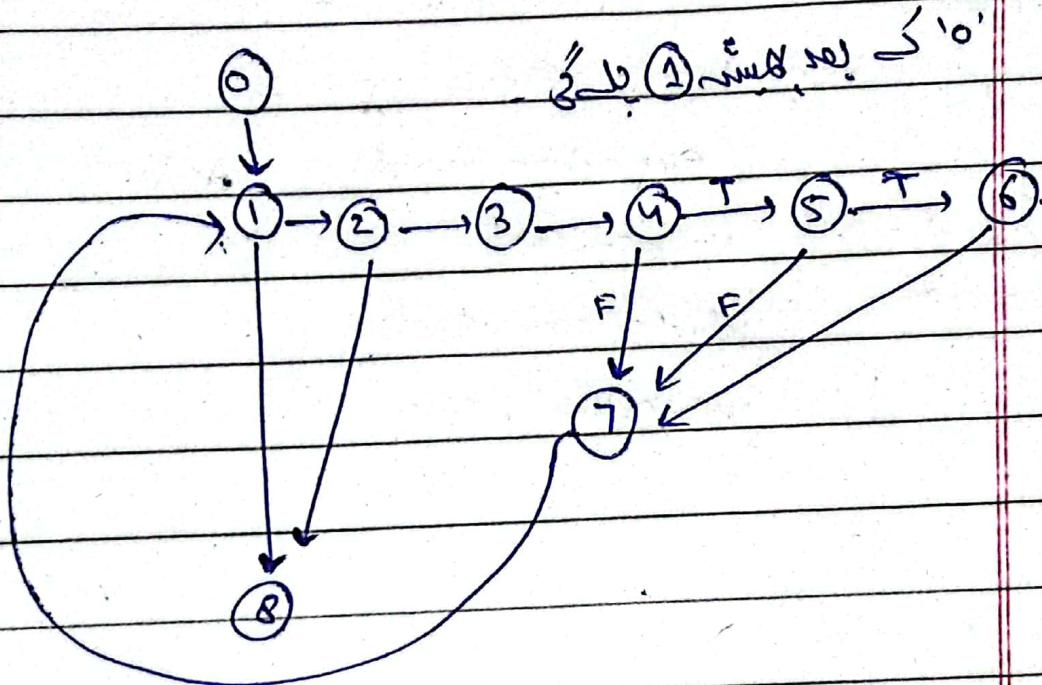
} ⑧

- These are white Box testing techniques.
- These are path testing.
- Cyclomatic Complexity is used to check how many paths exist in the code.

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- Firstly you will assign numbers to all nodes. (that will be your node)
- after that you will draw the graph :-



Nodes = 9

edges = 12

alc to formula:-

$$V(G) = E - N + 2$$

$$= 12 - 9 + 2 = 5$$

0 - 1 - 8

0 - 1 - 2 - 8

0 - 1 - 2 - 3 - 4 - 7 - 1

0 - 1 - 2 - 3 - 4 - 5 - 7

0 - 1 - 2 - 3 - 4 - 5 - 6 - 7

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* The path which you repeated one time, don't need to visit it again.

* If there are more than one path, then choose the smallest path.

	expected input	Actual
0-1-8	value = -999	
0-1-2-8	value = 1000 i = 101	
01-2-3-4-7-1	value = 1000 , i = 50	

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Week 1A

Tuesday

Loop Testing

loop Nested Concatenated

① input such a value that loop do not execute.

② input such a value that loop execute only once.

③ loop execute maximum times.

④ $n+1$

⑤ $n-1$

X total as test cases

if you have nested(2) loops :-

Outer loop

$i=5$

5

5

5

5

0

0

0

0

0

Inner loop

$j=5$

10

0

6

4

5

10

0

6

4

Date: _____

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Concatenated loops are dependent
on each other.

1st loop {
for ($i = \text{input1}; i \leq n; i++$)
 {
 cout << '*';
 m++;
 }

2nd loop {
for ($j = \text{input2}; j \leq m; j++$)
 {
 cout << '*';
 }

How to test?

→ and loop or 1st value is 2nd loop's
→ (وند) یعنی تو دونوں کی اگر والی

→ independent کی تو ہے (وند) کی
→ یعنی combination کی

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i	j	i	j
$n+1$	skip	6	4
$n+1$	1	6	3
$n+1$	$n+1$	6	2
$n+1$	$n+1$	6	1
$n+1$	max	6	0

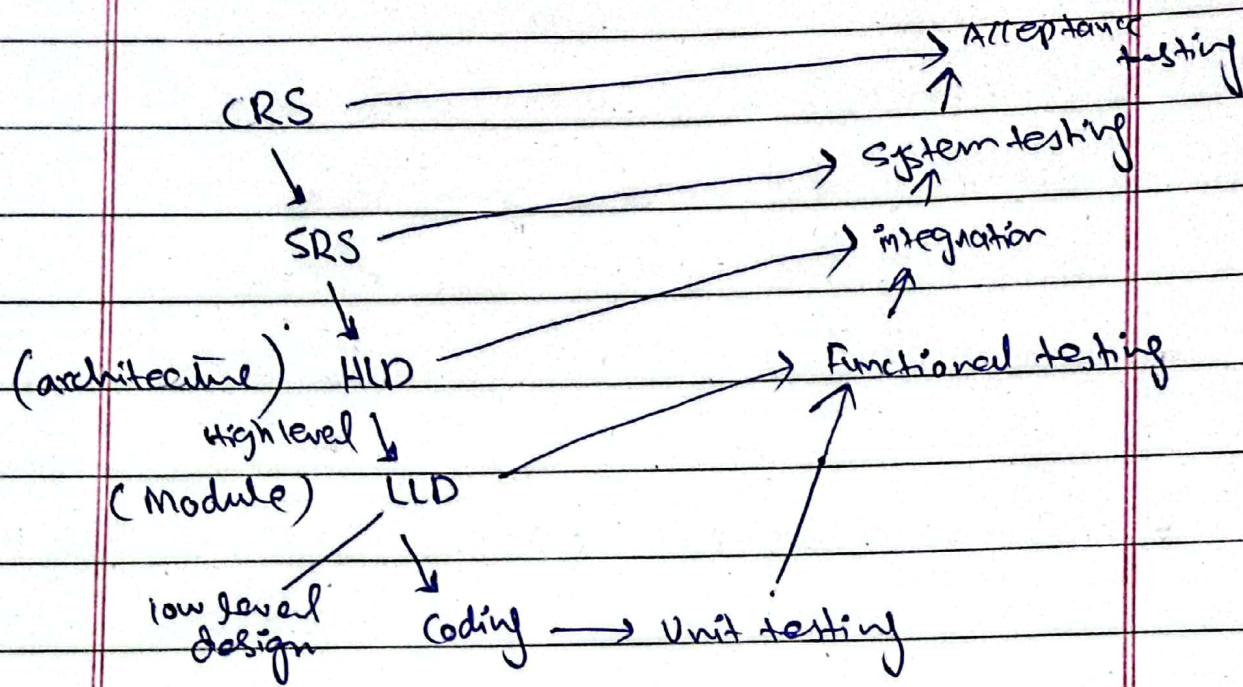
Day: _____ Date: _____

02-04-24

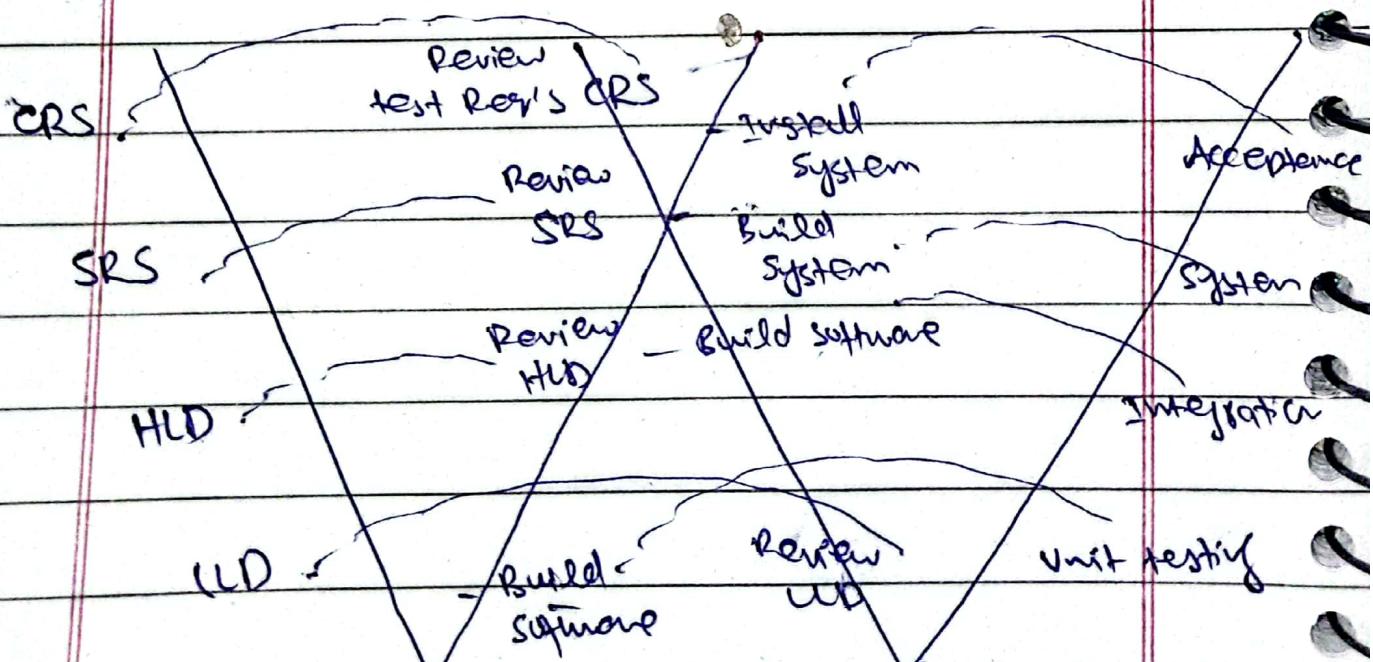
Week 12

Tuesday

V Model Software Testing:



W Model Software Testing:-



Date: _____

Date: _____

CRS:

- Customer Req' Specification
- these are non-technical document.
 - (i) paper upload before 5 minute.
 - (ii) Result upload at a same time

acceptance testing:

- Buyer of a product performs acceptance testing. or you can say client performs this testing
- after that a document is signed.

SRS:

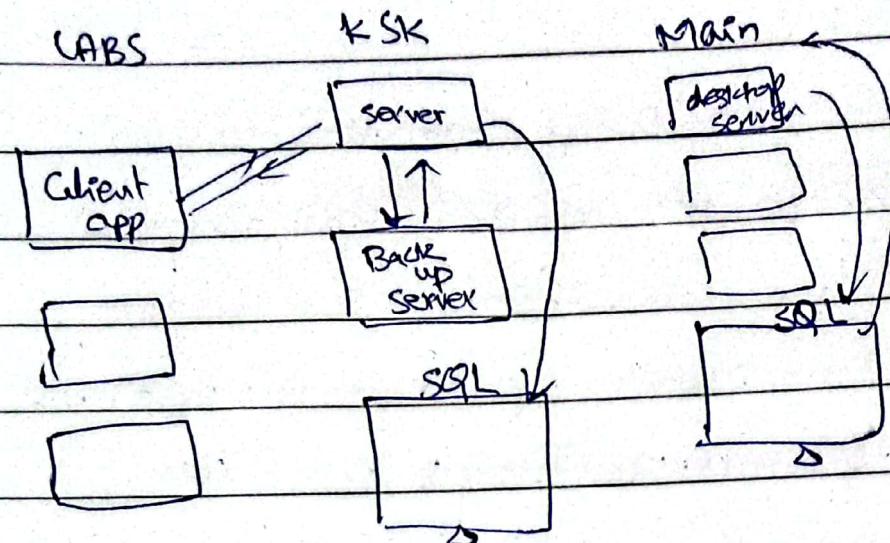
- This is a technical document
- for example login, logout, create user, generate roll num slip.

HLD:

- High level design
- after reading all your requirement an architectural design is created.

Date: _____

Date: _____



a basic architecture of
NET's Ecat app

LLD:

- In this Gantt chart is also included.
- stands for low level design.
- also include mathematical calculation and functions.

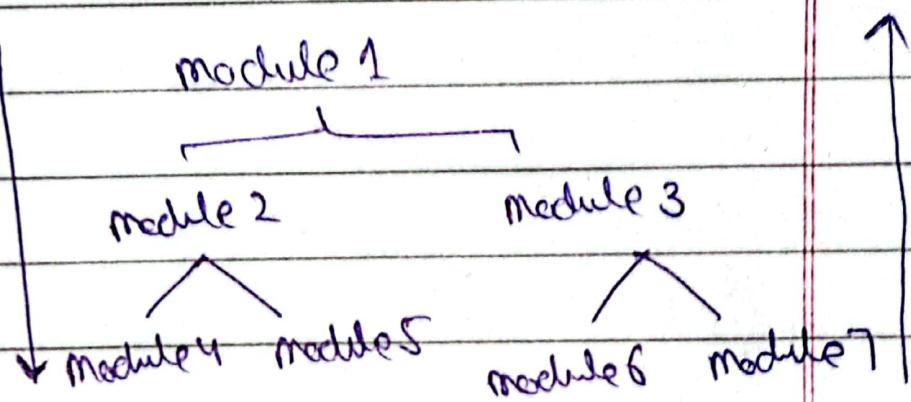
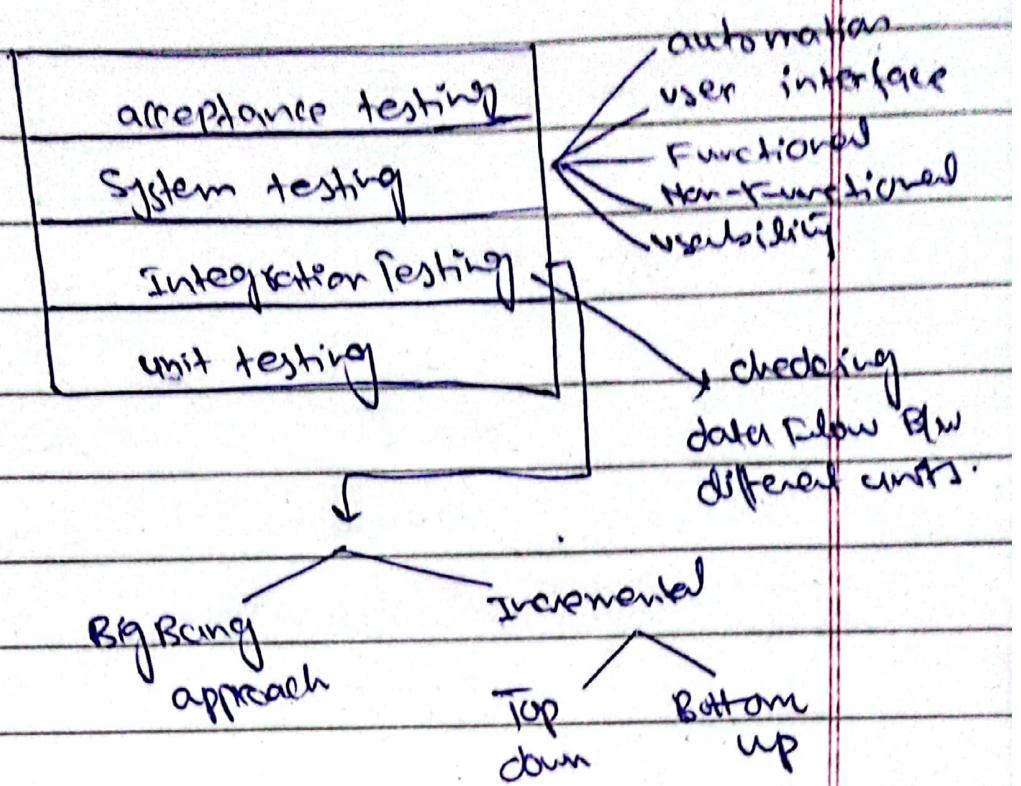
disadvantage of V:

دificult to write coding in

- few planning

testing will not start until
coding is not complete.

Week 15



SYSTEM TESTING :-

Setup environment → Test Case → Testing data generate → generate

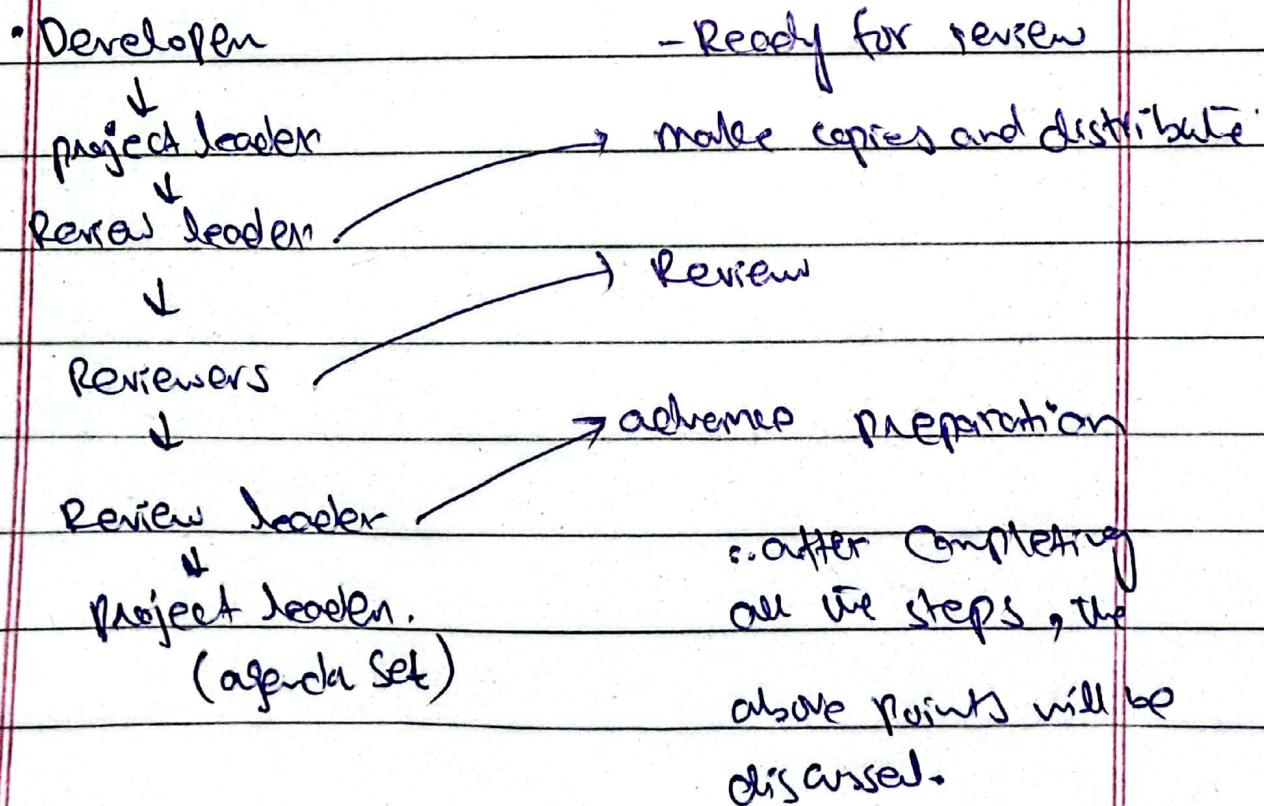
Regression testing ← Detecting Reporting ← execute
Detects Retesting & timing Test Case

Week 16

Software Reviews

Informal reviews Formal technical reviews
(FTR)

- Agenda
- presentation
- Walkthrough
- schedule
- Raise issue / bugs
- checklist
- Recording
- 3-5 people
- < 2 hour



Date: _____

Date: _____

- All attendees of FIR must decide :-
- accept the product without modification
 - Reject the product
 - Accept provisionally

Summary Report :-

- What is reviewed
- who reviewed
- findings and conclusion
- provide checklist for developers.

→ Desk Review / Buddy review :-

after completing your document,
Review your document on your
own.

→ Developer (Frontend, Backend, features, SS0)

→ Agenda Items | Actionlist -

Week 17

Data Flow Testing:

read a,b,c line(1)
if (a>b) ①
 x=a+1 ③
 Print x ④
ELSE
 x=b-1 ⑤
 Print z ⑥

Variables	Defines	Use
a	1	2,3
b	1	2,5
c	1	NA
x	3,5	4
z	NA	6

Date: _____

Date: _____

- Compilers doing data flow testing on their own -
- 'Define' must be less or equal to 'Use'