[SE]

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T4IT-1

* ASSIGNMENT 2 *

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Q1. Define following terms.

→ (a) Verification

→ SRS is traceable when source of each requirement is clear.

→ SRS is verifiable when specified req can be verified with cost-effective process to check whether final s/w meets requirements

→ Requirements are verified with help of reviews, note that ambiguity is essential.

(b) Validation

→ Review req specification for errors, ambiguity, omissions & conflicts.

→ It examines to ensure that all s/w req have been stated unambiguous and errors have been detected & corrected.

(c) Cohesion

→ It is an indication of relative functions strength of module

→ A cohension module perform single task, requirement little interaction with other components in other part of a program.

(d) Coupling.

→ coupling is indication of relative inter-dependence among modules.

→ It depends on interface complexity between modules, point at which entry or reference is made to module & what data passed.
→ A module having high cohension & loco coupling is said to be functionally independent of other modules.

Q2. Write short note on black & white box testing.

→ White box testing

→ also called glass-box testing, that uses control structure described as part of component-level design to derive test cases.
→ Using this, you can derive test cases that:
(i) Guarantee all independent path within module have exercised at least once
(ii) Exercise all logical decisions
(iii) Execute all loops at their boundaries & within their operational bounds.
(iv) Exercise internal data structures to ensure their validity.

→ Applicable to:
- Unit testing & integration testing (mainly)

testing paths within units. ↑ testing paths between units. ↑

→ Black-box testing

- also called behavioral testing, focuses on func° req of s/w.
- It is not an alternative to white-box. Rather, it is complementry approach that is likely to uncover difficult class of errors that white-box method.

→ Finds error in follo° categories:
(i) Incorrect or missing func.
(ii) Interface errors
(iii) Errors in data structure or external database access.
(iv) Behaviour errors.
(v) Initialization & termination errors.

→ Applicable to:
- mainly system testing & acceptance testing
- integration testing.

→ The higher the level, hence bigger & more complex the box, more black box testing comes into play.

03. Explain different design concepts.

→ S/w design sits at technical core of SE and is applied regardless of S/w process model that is used.

(a) Data design

- It transform info domain into data structure that will req to implement S/w.
- Data obj & relationship defined in entity rel^n diagram.
- Part of it may occur in combo with S/w architecture

(b) Architecture design

- defines rel^n between major structural elen of software.
- It represents framework of computer based system, can be derived from system specification, the analysis model.

(c) Interface design.

- describe how S/w communicate within itself, with system that interoperate with it, & with humans who use it.

- An interface implies a flow of info & a specific type of behaviour.
- data & control flow diagram provide much information.

(d) Component-level design

- transforms structural ele^n of s/w architectural into a procedural description of s/w components.

Q4. Explain cyclomatic complexity.

→ It is source code complexity measurement that is a being correlated to no. of coding errors.

→ Calculated by developing control-flow graph of code that measures no. of linearly independent path through prog module.

→ Lower the cyclomatic complexity, lower the risk to modify & easier to understand.

Cyclomatic complexity
$= E - N + 2P$.

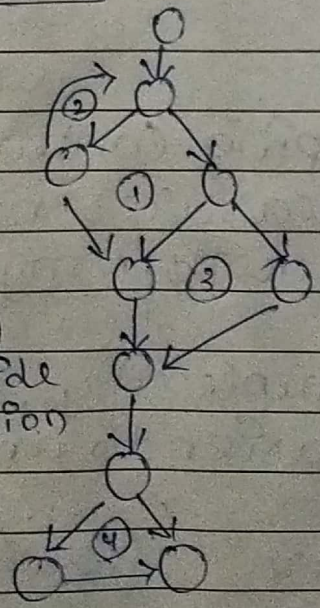
where,
E - no. of edges

N = no. of nodes in flow
P = no. of nodes that have exit points or say connected components

→ Another method.
$V(G) = \pi + 1$
where,
π is no. of predicate nodes (should have atleast 2 outgoing edges.)
connected in flow graph G

→ Third method
V(G) = no. of region of flow graph.

Example:



$V(G) = (E - n + 2P)$
$= 13 - 10 + 2(1)$
$= 5.$

$V(G) = 4 + 1 \quad (\pi + 1)$
$= 5.$

V(G) = no. of regions
= 5.