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Software assignment

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Ans1. Error  $\Rightarrow$  Error is the difference in derived output and observed output.

Mistake  $\div$  A mistake can occur due to developer's coding errors as requirement was misunderstood or not define correctly.

Bug  $\div$  A Bug is the terminology of tester. An Error found in the development environment before the product is shipped to the customer.

Fault  $\div$  Fault is a condition that a system cannot perform specific task.

Failure  $\div$  Failure is the complete breakdown of the system.

Ans2 Alpha, Beta & Acceptance Testing  $\div$

Alpha testing  $\div$  Alpha testing are conducted at the developer's site by some potential customer. These tests are conducted in a controlled environment. Alpha testing may be started when formal testing process is near completion.

Beta testing  $\div$  Beta testing are conducted by the customers/end user at their sites. Unlike alpha testing developer is not present here it is conducted in a real environment that cannot be controlled by the developer.

⇒ Acceptance testing : It is used when software is developed for a specific customer. A series of tests are conducted to enable the customer to validate all requirements. These tests are conducted by end users/ customer & may range from ad-hoc tests to well planned systematic series of tests.

Ans (a) Unit testing ⇒ It means testing a unit—that smallest piece of code that can be logically isolated in a system. Its primary purpose is to test each unit or function.

(b) Integration Testing ⇒ The specific target of Integration testing is the interface: whether parameters match on both sides as to type, permissible ranges, meaning and utilization.

(c) System testing : System level testing is closest to our everyday experiences. we test many things. we evaluate a product in terms of our expectations, not just a specification or a standard. goal is not just to find faults, but to demonstrate performance. System testing tends to be less formal than it might be & is compounded by reduced testing interval that usually remains before a delivery deadline.

(d) Mutation testing : It is a fault based testing technique similar to fault seeding, except that mutations to program statements are made in order to determine properties about test case.

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Ans 16) Test Case design refers to how you set up your test cases. It is important that your tests are designed well, or you would fail to identify bugs & defects in your software during testing.

Objectives :- Designing good Test Cases ensure that every aspect of your software gets tested so that you can find & fix any issues.

### Designing Test Cases :-

- 1) Boundary Value Analysis
- 2) Equivalence Partitioning
- 3) Decision Table testing
- 4) State Transition Diagrams
- 5) Use case testing

Ans 18) Software Maintenance is a very broad activity that includes error corrections, enhancement of capabilities, deletion of obsolete capabilities & optimization.

- Corrective Maintenance :- This refers to modification initiated by defects in the software.
- Adaptive Maintenance → It includes modifying the software to match changes in the ever changing environment.
- Perfective Maintenance → It means improving, processing, efficiency over performance over restructuring the software to improve changeability. This may include enhancement of existing system functionality, improvement in computational efficiency etc..

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Ans 2 Development effort ( $P$ ) = 600 pms

$$K = 0.5$$

$$c = 7$$

$$d = 0.7$$

$$m = P + K e^{(c-d)}$$

$$\therefore = 600 + 0.5 e^{(7-0.7)}$$

$$= 600 + 272.29$$

$$\boxed{m = 872.29}$$

Ans 3 Ripple effect :- Those errors which are not caught in initial or (same) phase and transfer to next then the effort and cost of solving the error increases, that is called Ripple effect.

- If errors are not solved in occurring phase and the transfer to next phase, ripple effect increased, it may increases the cost and complexity of software.

Ans 2  $ACT = 10\%$ ;  $FAF = \text{multiplier of diversity}$   
 $SDC = 500 \text{ pm}$ .

$$AME = ACT + SDC * FAF$$

$$\approx 10 \times 500 * 1.15 * 1.08 * 0.86 + 0.9 * 1$$

$$\boxed{AME = 46.169 \text{ pm}}$$

Ans 3 Tools

- file combinator
- compiler and linker
- debugger
- cross-reference generator
- static code analyzers

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⇒ file Comparater:

- It compares two files on system and maintains the record of differences in the file.
- It determines whether the two files on the system are identical or not.

⇒ debugger:

- ⇒ Allows tracing the logic of the program and examine the contents of the registers and memory areas.

⇒ Techniques:

- ⇒ Software configuration management
- ⇒ Impact analysis
- ⇒ Software regeneration.

Ans 24) ISO 9126 Quality model:

- This model has two primary categories Internal or external quality attributes.
- The internal quality attributes are the properties of the system the evaluation of which can be done without executing it.
- External quality attributes are those that are evaluated by observing the system during execution.

⇒ Mc Call's model:

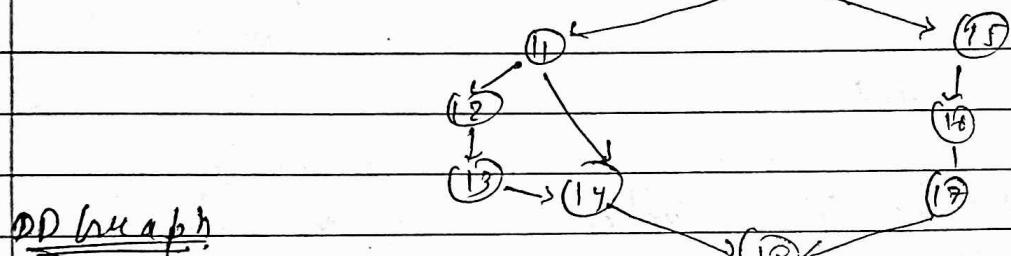
- Mc call model is the first quality model developed,

which defines a layout of various aspect that define the product quality.

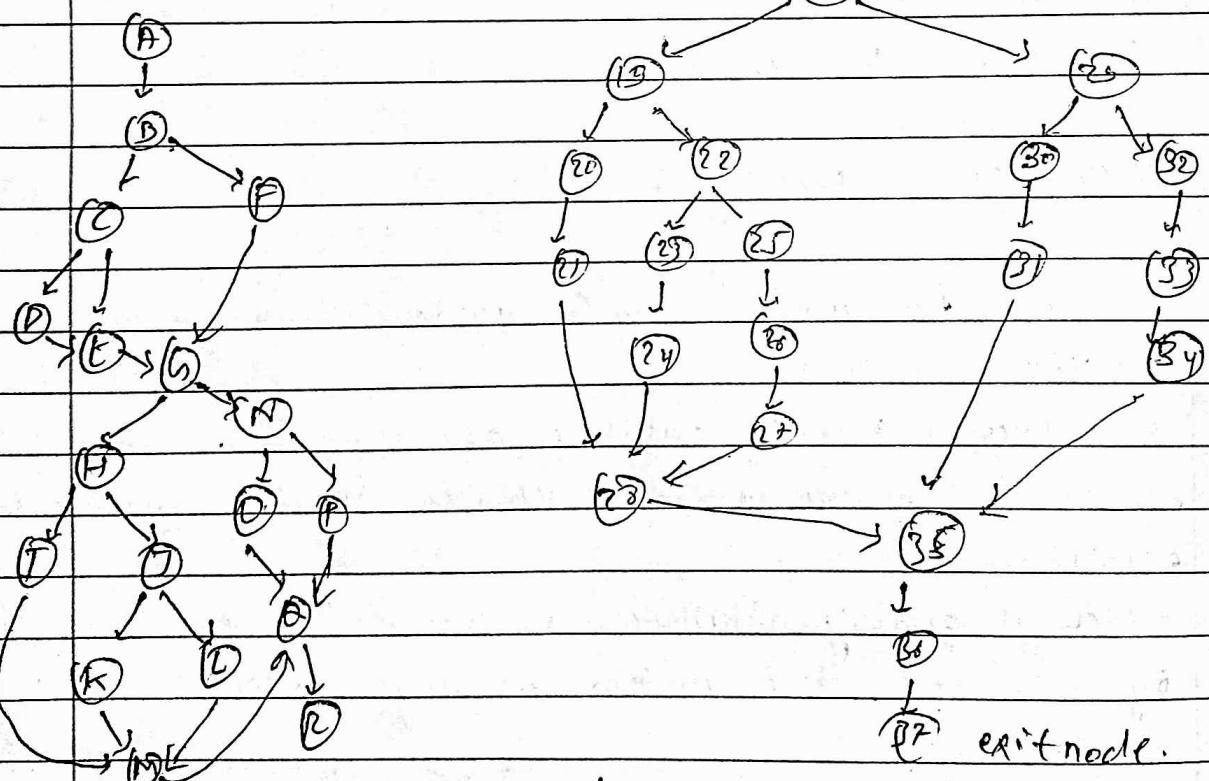
- It defines the product quality in following manner
- product revision
- product operation-
- product deals with maintainability, flexibility, testability
- product operation.

### Ans 15) Program flow graph:

$$① \rightarrow ② \rightarrow ③ \rightarrow ④ \rightarrow ⑤ \rightarrow ⑥ \rightarrow ⑦ \rightarrow ⑧ \rightarrow ⑨ \rightarrow ⑩$$



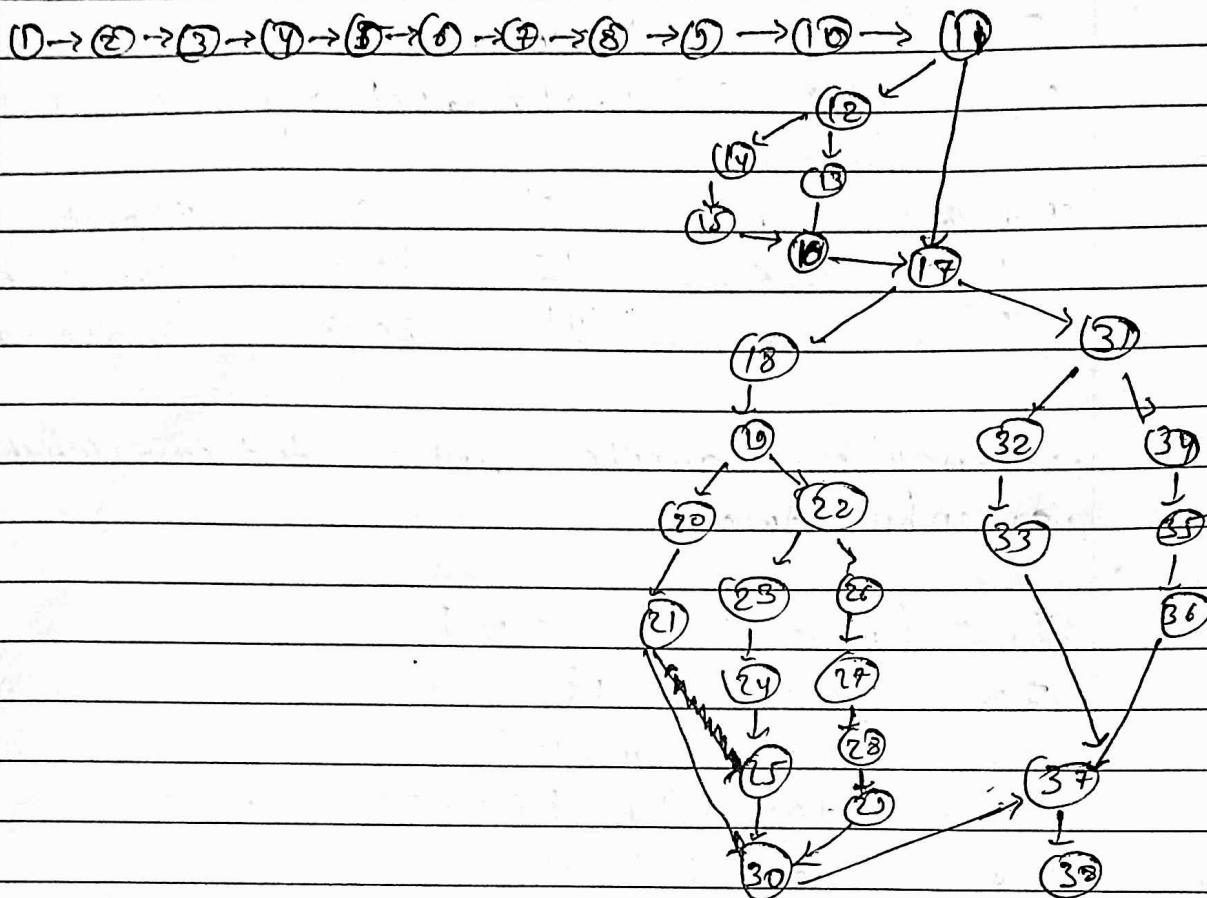
DD graph



Independent paths are :-

- ① A B F G N P O R
- ② A B F H I N O D R
- ③ A I B G E L N P O R
- ④ A B C D E I
- ⑤ A B F G H I Z M O R
- ⑥ A B F G H J K M O R
- ⑦ A B F G H J M O R

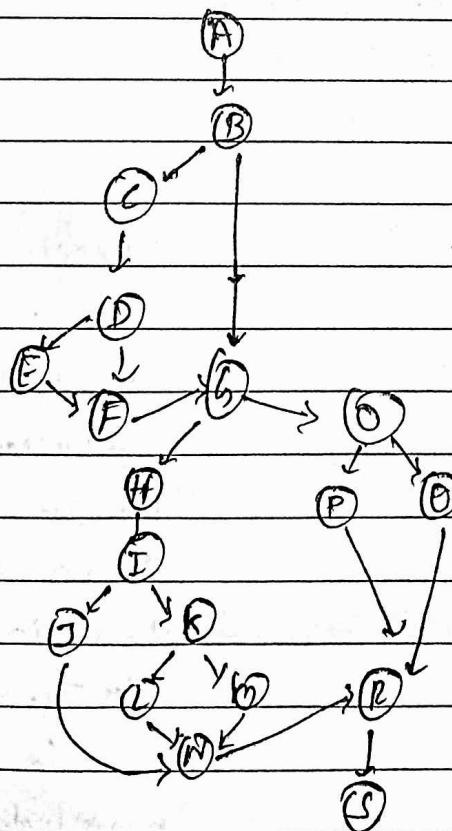
Ans 14

Flow graphDD path graph

(39) Exit.

Independent paths from

DD path graph are:



(1) A B C D E F G H O R S

(2) A B C D E F H O P R S

(3) A B C D E F G H O P R S

(4) A B C D E F G H O P R S

(5) A B C H I J N R S

(6) A B C H I J K L N R S

(7) A B C H I J K M N R S

Ans(8) Output domain of input classes :-

$O_1 = \{ (D, m, y) \geq : \text{previous date if all are valid input} \}$

$O_2 = \{ (D, m, y) \geq : \text{invalid date if any input make invalid} \}$

Test Case	m	D	y	expected O/P
1	6	15	2012	14-June-2012
2	6	31	2012	Invalid

we may have another set of test case which are on input domain.

$$I_1 = \{ \text{month} : 1 \leq m \leq 12 \}$$

$$I_2 = \{ \text{month} : m \leq 13 \}$$

$$I_3 = \{ \text{month} : m > 12 \}$$

$$I_4 = \{ \text{day} : 1 \leq d \leq 30 \}$$

$$I_5 = \{ \text{day} : d \leq 18 \}$$

$$I_6 = \{ \text{day} : D > 30 \}$$

$$I_7 = \{ \text{Year} : 1950 \leq \text{Year} \leq 2075 \}$$

$$I_8 = \{ \text{Year} : y \leq 1950 \}$$

$$I_9 = \{ \text{Year} : y \geq 2075 \}$$

Test Case	m	d	y	Expected output
1	6	15	2012	14 June 2012
2	-1	15	2012	Invalid input
3	13	15	2012	Invalid input
4	6	15	2012	14 June 2012
5	6	1	2012	Invalid input
6	6	31	2012	Invalid Input
7	6	15	2012	14 June 2012
8	6	15	1949	Invalid Input
9	6	15	2076	Invalid End

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Ans 3 Four Robustness test cases =  $6n+1$ ;

Total no. of test cases:  $6n+1 \rightarrow n=3$

So, 1. Robust test cases =  $18+1 = 19$ .

Test cases	Day	Month	Year	Expected O/P.
1	0	6	2012	Invalid date
2	1	6	2012	31-may-2012
3	2	6	2012	1-June-2012
4	15	6	2012	1y-June-2012
5	30	6	2012	20-June-2012
6	31	6	2012	Invalid date
7	15	0	2012	Invalid date
8	15	1	2012	14-Jan-2012
9	15	2	2012	14-Feb-2012
10	15	11	2012	14-Nov-2012
11	15	12	2012	14-dec-2012
12	15	13	2012	Invalid date.
13	15	6	2012	14-Jun-2012
14	15	6	1949	Invalid date
15	15	6	1950	14-Jun-1950
16	15	6	1951	14-Jun-1951
17	15	6	2074	14-Jun-2074
18	15	6	2075	14-Jun-2075
19	15	6	2076	Invalid date.

Ans 2)  $ACT = \frac{k'LOC_{dev} + k'LOC_{mtd}}{k'LOC_{total}}$

$$SDF * ACT = AME$$

where  $SDF =$  software development factor

$ACT =$  annual change traffic

$EAF_{AMT}$  = effort adjustment factors.

$AME =$  annual maintenance effort

$$ACT = 25\%$$

development effort = 20 lac.

total duration = 10 years.

$$AME = 0.25 \times 20 = 5 \text{ lac.}$$

Maintenance effort after 10 years =  $5 \times 10 = 50 \text{ lac.}$

total effort =  $50 + 20$

$$= 70 \text{ lac.}$$