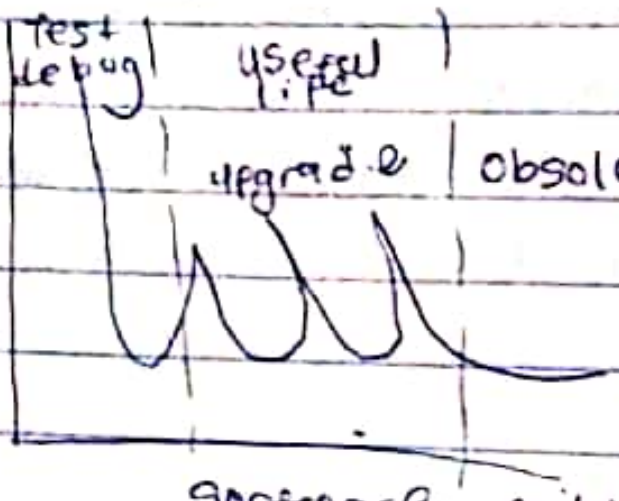
Software Reliability

⇒ failure free operation, specific condition

Software reliability is the ability of a system to have a failure free operation in a specified time period.

Reliability is a function of time.



Software failure curve.

The upgrade represents feature upgrade. For feature upgrade, the complexity of the software is likely to be increased. Since the functionality of the software is enhanced. Even bug fixes may be a reason for more software failure.

The Test debug represent the stages of testing and debugging the software

The useful life of the software stage, upgrades are carried out.

The obsolete represent the wear out of the software

To manage this, there are three fault management strategies:

i) fault avoidance: In this step, development techniques are used to either minimize the possibility of mistakes or to trap mistakes before they result into the introduction of system fault.

ii) fault detection and removal

Here, involves verification and validation techniques that increase the probability of detecting and correcting errors before the system goes into service.

iii) Fault tolerance: Here runtime techniques are used to ensure that system faults do not ~~lead~~ to result in system errors and/or that system errors do not lead to system failure.

Availability

This is the probability that a system at a point in time would be operational and able to deliver the requested services

$$A = \frac{\text{Uptime}}{\text{uptime} + \text{downtime}}$$

There are two types of reliability requirements or reliability metrics.

① Non-functional reliability requirements

These are the specifications of all the required reliability and availability of the system using the following

i) Probability of ~~the~~ failure on the demand

Probability that the system will fail when a service request is made.

ii) Rate of occurrence of failure
= No of failures / total no. of hrs

iii) Availability.

(23) Fundional reliability requirements

This specifies the fault to be detected and the actions to be taken to ensure that these faults do not lead to system failure.

There are four types of fault~~tolerance~~ tolerance systems

Protection system

Self-monitoring architecture

N-vision programming

Hardware fault tolerance.

} Make notes on them

Next class

- Difference btw hardware & Software reliability
- Software quality.

Software quality control → Product or Service

Software quality assurance → Process

Software quality is the rating of a software a defined generalized software design standard.

Read up quality assurance specipications
" " Fault Tree Analys

Three methods to pay close attention to per determining fault.
① FTA ② FMEA ③ HAZOP.

Cost of Quality =