

These questions relate to the SRM Theory to Practice article (by F.T. Sheldon) that was handed out in class. *Please* hand up to a maximum of three pages of typewritten answers according to the format outlined in the syllabus.

1. [20pts] What is software reliability measurement? That is, what are the principle components that make up the equation?

SRM is determining the probability of failure-free operation for a specified time in a specified environment for an intended purpose. There are three main components that make up the equation: 1) Assessment and model development, 2) Measurement, and 3) Estimation/prediction for the purpose of managing the process and product release.

2. [20pts] Refer to the S/E Glossary to compare the following terms to your answer in question 1: (a) Reliability Growth, (b) Reliability, and (c) Operational Reliability.

Reliability growth. *The improvement in software reliability that results from correcting faults in the software.*

Reliability. *The ability of an item to perform a required function under stated conditions for a stated period of time. (ANSI/ASQC A3-1978) (2) See software reliability.*

Operational reliability. *The reliability of a system or software subsystem in its actual use environment. Operational reliability may differ considerably from reliability in the specified or test environment.*

3. [20pts] Describe what characteristics (i.e., metrics) to look for when gathering data to support the measurement process (name 4)? How can these be viewed in a rigorously analytical manner?

In gather in specific measurement data, one main concern is to find the right information that will work in the available models and that could provide insight into the root cause of problems. What are the HW/SW elements, will the system evolve in function and purpose? Some traditional defect measurement metrics include (as they are related to time) time of failure, time interval between failures, cumulative failures and defect density. It is important to tract the location and manifestation of the failure as well as the suspected cause (i.e., how was it introduced) and the severity of failure.

4. [20pts] Describe the defect removal process. What are the measures that can be obtained during this process?

The process starts with testing. If a defect is detected, a decision is made weather to fix it. The defect fixing process may be deferred otherwise it is corrected and in both cases the process returns to testing. If the software is deemed reliable enough for its intended purpose it is put into operation (fielded). If a defect is found in the field, there is grounds for a new release of the repaired version. Cost of this release must be weighed against the benefits of such. As this process evolves the knowledge of the model and the process and product improves and must be captured.

5. [20pts] In your own words and opinion what is the main problem we are currently faced with in the Software Engineering industry. Will this problem ever be overcome or at least improved on?

Most any answer that is reasonable and shows (in my judgement) thoughtfulness and is within the context of (loosely applied) issues and topics covered in class is acceptable. My personal opinion is that our biggest challenge is the development of methods and tools for the cost effective production of safe and correct software. Its one that will not be solved by finding any one answer but through an evolutionary process of refinement because indeed (in Frederick Brooks words) there is no silver bullet.