SE-410 Homework 2
Cameron Stark

2.7.1: Explain the Difference between software reliability and system availability.
Software reliability is the length of time that a piece of software performs its function, whereas software availability is the difference in total time and operable state time.

2.7.2: What is software dependability?
Software dependability is the amount of trust a piece of software or a program has by its users, because it meets the expected availability, reliability, safety and security expected

2.7.4: Describe the Cleanroom methodology.
The Cleanroom methodology is designed similar to that of a cleanroom in electronic construction in that its purpose or goal is the prevention of defects in the software rather than their removal.

3.18.1: What are formal methods and describe their potential benefits? How essential is tool support?
Formal methods are a mathematically based technique for describing, defining and verifying the design and construction of a software project. The benefits of formal methods are that they are not abstract or ambiguous which prevents misinterpretation.

3.18.4: Discuss the industrial applications of formal methods and which areas have benefited most from their use? What problems have arisen?
The industry uses formal methods in systems that are very complex and where the survivability and reliability of the system are vital to safety of the users, an example would be a planes software systems, where if an issue is found in the software the entire program does not fail, because the system was formally designed.

3.18.6: Explain the difference the model-oriented approach and the axiomatic approach.
The Model Oriented approach makes the use of models to outline, define and structure the scope of a project, whereas the axiomatic approach makes use of several axioms and mathematical definitions to define the project scope and structure

4.6.1: What is a set? A relation? A Function?
A set is a collection of like items, such as the set of all real numbers.
A relation is a statement of the items in set A are in the set of B.
A function is a special type of relation where the elements in A are shared by at most one other element in B

4.6.2: Explain the difference between a partial and a total function?
A partial function can be undefined for some values in the set A
A total function is defined for all values in set A

4.6.3: Explain the difference between a relation and a function?

The difference between a relation and function is that in a function the elements of one set don't have to map to the elements of another set in a relation they are just both subsets of a larger set

4.6.4: Determine A x B where A = { a ,b ,c ,d} and B = { 1, 2, 3 }

A X B = { (a,1), (a,2), (a,3), (b,1), (b,2), (b,3), (c,1), (c,2), (c,3), (d,1), (d,2), (d,3) }

4.6.11: Give examples of injective, surjective, bijective functions.

Injective is a $1-1$ function where one element maps to another element in different sets

Surjective is not a $1-1$ function, where multiple elements can map to same the same element in a different set.

Bijective is a function that is both injective and surjective