Name: _____ Registration #: _____

1. What is professional malpractice? Can an IT worker ever be sued for professional malpractice? Why or why not? **(5 Points)**

Courts have consistently rejected attempts to sue individual parties for computer-related malpractice. Professional negligence can only occur when people fail to perform within the standards of their profession, and software engineering is not a uniformly licensed profession in the United States. Because there are no uniform standards against which to compare a software engineer's professional behavior, he or she cannot be subject to malpractice lawsuits.

2. Why is the human interface one of the most important but difficult areas of safety-critical systems? What must the system designer consider? **(5 Points)**

Human behavior is not nearly as predictable as the reliability of hardware and software components in a complex system. The system designer must consider what human operators might do to make a system work less safely or effectively. The challenge is to design a system that works as it should and leaves little room for erroneous judgment on the part of the operator.

3. Your company is considering using N-version programming with two software development firms and two hardware devices for the navigation system of a guided missile. Briefly describe what this means, and outline several advantages and disadvantages of this approach. **(5 Points)**

N-version programming is a form of redundancy that involves the execution of a series of program instructions simultaneously by two different systems. The systems use different algorithms to execute instructions that accomplish the same result. The results from the two systems are then compared; if a difference is found, another algorithm is executed to determine which system yielded the correct result. In this case, instructions for the two systems will be written by two different software development firms and run on different hardware devices.
The advantages include:

It is highly unlikely two systems will fail at the same time under the same conditions.

Having two separate firms develop the systems will help to ensure both systems do not fail in the same way, since each firm will be independent in their implementations.

In building a safety-critical system, N-Version systems offer more reliability than just one system.

The disadvantages include:
If both systems do fail and the failures are correlated, the practical gain in reliability may be limited.
The costs associated with using two separate firms may be greater than if one firm developed both systems.