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**Software Engineering I (CS 561)**

**Exam I**

When answering questions on this exam, read each question carefully being sure to follow instructions and provide answers based upon the material covered in this course.

Part I. Circle T or F to indicate true or false, respectively. Evaluate truth in terms of the material covered in this course. Each question is worth 2 points, 22 points total.

1. T F Functional requirements may include inputs, outputs, data stored,  
    computations, timing, and synchronization.
2. T F Quality requirements include the technology to be used and the  
    computing platform.
3. T F Political risks are a possible difficulty in software engineering.
4. T F Software engineering is solving developers’ problems by systematic  
    development and evolution of large high quality software systems.
5. T F In Object Oriented Programming, Java interface definitions include only  
    abstract methods and constants as the interface body.
6. T F Dynamic binding is rewriting a method definition for a subclass with  
    different parameters.
7. T F A framework is reusable software with a generic solution to a  
    generalized problem.
8. T F Hooks are portions of a framework that must be implemented.
9. T F Evolution projects typically include work that corrects, adapts,  
    enhances, and/or re-engineers a software project.
10. T F Thin clients perform most of the processing on the client side.
11. T F Central use cases are use cases that a project may be built around.

Part II. Short and long answer questions, 78 points total.

1. List the four types of stakeholders and explain their roles in the software engineering process (8 points).
2. Provide UML diagrams being sure to denote generalization for the following: a superclass called Television with attributes: maxChannel, minChannel, numChannels, channel, maxVolume, minVolume, and volume; and methods: turnOn, turnOff, channelUp, channelDown, volumeUp, volumeDown; a subclass called analogTelevision with methods scanCableChannels and scanAntennaChannels; and a subclass called digitalTelevision with methods scanDigitalCableChannels, scanDigitalAntenna channels, scanAnalogCableChannels, and scanAnalogAntennaChannels (15 points).
3. Provide a use case for the scanDigitalCableChannels method. Assume that the user must access and navigate a menu that contains a “scan for channels” option and a submenu that contains a “scan for digital cable channels” option. Available buttons include “menu”, “up”, “down”, “left”, “right”, “back”, “exit”, and “enter” are available. Your use case should include at least 6 steps (10 points).
4. Define polymorphism and give an example of its use in Object Oriented Programming (5 points).
5. Provide three of the required parts of a client and two of the required parts of a server. Explain each part (10 points).
6. Assume you are tasked with developing a web-based job application system for a major airline and you are gathering requirements. Give two examples of reasonable questions to ask during an initial client interview. Such a system would have a large number of potential users including job candidates and human resources team members. What would be three other appropriate requirements gathering steps to take aside from interviews? Describe these steps (10 points).
7. Describe of each of the following quality requirements: response time, reliability, availability, resource usage, and throughput. Explain the importance of each with respect to the system in question 6. In answering this question, you may assume that the system services a large number of users; multiple servers are available; and uptime is critical (10 points).
8. List and describe three steps used in domain analysis (5 points).
9. Explain data abstraction and procedural abstraction and how each is used within the Object Oriented paradigm (5 points).