1a **What is software engineering?**
Software engineering as a disciple is focused on research, education, and application of engineering processes and methods to significantly improve software productivity and quality while reducing costs and time to market.

1b **What is PQCT?**
Four goals to ~~~~ achieve in software engineering.

P is to increase software productivity
Q is to increase software quality
C is to decrease ~~~~~~~~~~~ cost
T is to decrease time to market

1c **List Three challenges that software engineering must overcome?**
1. Conceptualization
2. Communication
3. Coordination

1d UML is a communication tool, by adding visual outlooks at different parts of the system, it can clarify the goals of the system, better ~~~~~ describe flows and application states, and remove a large amount of ambiguity while remaining flexible as it is not a formal model that must be followed

1c List the three software life cycle activities that are
needed in order to achieve the PQCT.
      For P, software development process
      For Q, software quality assurance
      For C & T, Software Project Management

2a Define "software process"
A software process defines a series of activities performed
to construct a software system. Each activity produces some
artifacts which are the input to other phases. Each phase
has a set of entrance criteria and a set of exit
criteria.

2b List the phases of the software model
      Systems Engineering
      Software Requirement Analysis
      Software Design
      Coding & Unit Testing
      Integration & ~~Integra~~ Integration Testing
      Acceptance Testing
      Maintenance

2c List Two Advantages and Two Disadvantages of waterfall.
Adv. - Its a simple, straight forward sequence of events.
Adv. - It supports function oriented project organization
Dis. - It is inflexible to requirement changes.
Dis - Customer may lose entire investment if the project fails

3a   What is a Use Case?
A use case is a summary of scenarios for a single task or goal.

3b   What is an Actor?
An actor is who or what initiates the events in a task. They are the role people and objects play.

3c   What of the following are use cases?
     2. Display a drop-down menu
     3. Calculate a students GPA
     5. Enter username and password

4a   What is requirement elicitation?
Requirement elicitation is the process to identify and formulate the capabilities for the software system

4b   List 1 functional requirement and one non-functional requirement for your team project.
Functional - The system shall allow a manager to coordinate a meeting for his/her teammates
Non-Functional - The system shall only find possible available time slots within acceptable business hours (7AM-8PM) without manager override.

4c   List at least 2 information collection techniques.
Stakeholder survey, user interviewing, literature survey

4d) List and explain the five steps of requirement elicitation.

1. Collecting information about the application
   - Finding out what customers need and what regulations require is crucial and informs all other decisions in requirement elicitation.

2. Constructing analysis models
   - Aids the understanding of the application, requirements, and constraints

3. Deriving Requirements and Constraints
   - Weighs the current situation with overall business goals, narrows focus of the application to avoid overreach, and sets constraints if/when regulation requires

4. Conducting Feasibility Study
   - Validates that purposed requirements, constraints, or purposed stories are possible and/or financially practical in both the state of development and within current time/cost preferences.

5. Requirements Verification and Validation
   Verifies that the product building process is correct and validates that the resultant product from the requirements would be the correct product in the eyes of the customer.

5a What is the major difference between the domain
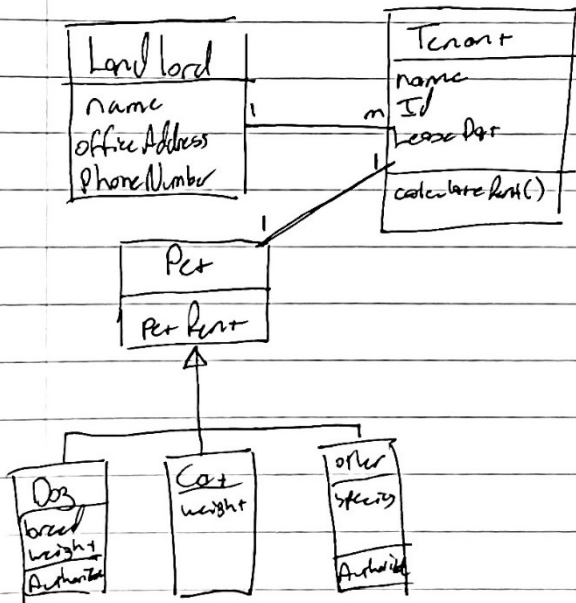diagram and a class diagram?
A domain diagram outlines the specific domains of
an early application. A class diagram is more robust,
building off of these initial domains to include all
expected attributes, relations, operations, and dependencies
of the actual schema

5b List the three relationships that could be found in a class
diagram, and draw a diagram to show an example
in reality for each of them (don't forget multiplicities)
1 Association
2 Aggregation
3 Generalization

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Carroll
midterm

5c What is the purpose of a State Diagram?

A state diagram demonstrates the ~~changes~~ possible states of an object and the transitions associated to the change in state.

5d What is the purpose of a sequence diagram?

A sequence diagram shows the sequence of events of a specific use case given in the use case diagram.

5e How many sequence diagrams to draw when developing a software system?

Each use case should recive a sequence diagram along with a diagram for each error handling case individually.

5f List at least three differences between UML activity diagram and traditional flow chart.

1. Activity diagrams can be divided into swimlanes for determining the object responsible for the activity.

2. A transition may branch into two or more mutally exclusive transitions with Guard expressions([I]) to label the transitions.

3. A transition may fork into two or more parallel activities.