Question 1 (25 points). System Development Environments
a. Draw the traditional picture of the 4 (four) phases in the Systems Development Life Cycle (SDLC) including their names (5 points).
b. Define in a sentence or two, what each of the phases in your diagram means (4 points each > 4 phases).
c. What part does the SDLC play in software development on the CSUSB campus? (4 points)
Question 2 (25 Points). Project Management
The table below describes the activities in the maintenance phase of a project. It shows the activities that must be completed before (preceding) each activity and the expected duration of each activity in days. Earliest and Latest times are left blank.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Preceding activities</th>
<th>Time (days)</th>
<th>Earliest Start</th>
<th>Earliest Completion</th>
<th>Latest Completion</th>
<th>Latest Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collect New Requirements</td>
<td>-</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Redesign and update database</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Design new processing</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Design new user interfaces</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Reprogram user interface</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Change processing code</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Test Processing</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Test user interface</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Integrate and test</td>
<td>7,8</td>
<td>1</td>
<td>1</td>
<td></td>
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<tr>
<td>10. Acceptance tests</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

a. Draw a simple network diagram of the activities (10 points)

b. Suppose that activity 1 starts at time 0(zero), calculate the earliest time each activity can start and the earliest time it can finish using your diagram, and putting the times in the correct blank entries in the table.(5 points)

c. Calculate the latest time it can finish and the latest time each activity can start without delaying the completion of the whole project, put the times in the blank entries in the table.(5 points)

d. Mark or highlight the critical path on your network diagram above.(5 points)
Question 3 (25 Points). Identifying and selecting projects
How are projects identified and selected? In your answer mention the people who are typically involved and the kinds of decisions that they have to make. (Scoring: people: 9 points, decisions 9 points, process 7 points)
Question 4 (25 Points). Planning projects
Write one or two sentences explaining or defining each of the following terms as defined in the textbook (5 points each):

Business case

Tangible benefit

Technical feasibility

Walkthrough

EDI
Question 5 (25 points). System Requirements: Elicitation
a. Describe four (4) traditional methods of discovering system requirements (5 points each).

b. How have new development tools (eg CASE, Visual Environments, etc.) and RAD methods changed the requirements elicitation? (5 points)
Question 6 (25 points). System Requirements: Use cases

Draw a simple use case diagram expressing the requirements for a system that handles grades for faculty and students. The diagram should show at least two (2) actors and at least three (3) use cases. It should only show communication associations between actors and use cases. No flowcharts! (Correct icons (5 points), correctly drawn links (5 points), good actor names (5 points), good use case names (5 points), good logic (5 points)).
Question 7 (25 points). System Analysis

Draw a Data Flow Diagram (DFD) that fits the following system:

Students login with an email Id and password and the system provides access to the schedule for the current quarter. Students pick classes and enrol in them. Enrolments are recorded in rosters. The system formats rosters for each class and sends them to teachers. Teachers can drop students on their rosters.

The DFD should have more than one process, more than source/sink and more than one data store. The words in bold in the above box should appear in your diagram at least once. You may have to invent some names. (Scoring: correct symbols 5 points, correct data flows 5 points, good process names 5 point, good data storage names 5 points, good logic 5 points).
Question 8 (25 points). Data Requirements

Draw a simple UML class diagram (conceptual model) for a student registration data base that expresses the following facts:

- A student can be enrolled in from 0 to 5 classes and a class has any number students enrolled in it.
- A class takes place in a unique room and in a unique time-slot. Each class is taught by a teacher.
- Each class is scheduled by a department, and each teacher works for a unique department.

The words in bold above should appear in your diagram at least once. You may have to invent some names. No flowcharts! Hide attributes and operations. (Scoring: correct icons 5 points, correct associations 5 points, good names 6 points, correct multiplicities 6 points, replacing any many-to-many associations by classes correctly 3 points).
Question 9 (25 points). Alternative Strategies
Describe five (5) different sources of software components (5 points each). For each option: name it (1 point), say when this kind of organization is a good choice (2 points), and what internal staffing is needed to develop/support/integrate it (2 points).
Question 10 (25 points). Human Interfaces

a. What makes a good human interface? (essay 15 points)

b. In what ways (if any) are Web-based interfaces (using a browser) different to using paper-based interfaces? (essay 10 points)
Question 11 (25 points max). Implementation and operation phase.

a. Write a list of the activities that occur when implementing and operating a computer system (3 points each, only 7 activities earn credits).

b. Which of these activities is most important? Why? (one or two sentences, 4 points)