

| | |
|---|----------|
| Getting Started | 2 |
| Textbook | 2 |
| Syllabus | 2 |
| Grading | 2 |
| TAs | 2 |
| Group Members and Project Preference [Due on 16/01/2024] | 3 |
| Academics | 3 |
| Travel | 3 |
| E-commerce | 3 |
| Social Media | 3 |
| Healthcare | 3 |
| Evaluation | 4 |
| Course Exam | 4 |
| Review 1 (SRS & Architecture) | 4 |
| Review 2 (Design & Test Plan) | 4 |
| Review 3 (Software Demo & Test Report) | 4 |
| [30 Points] Software Requirement Specification [Due on 28/01/2024] | 5 |
| [30 Points] Software Architecture [Due on 15/02/2024] | 6 |
| [30 Points] Software Design [Due on 08/03/2024] | 7 |
| [30 Points] Test Plan [Due on 25/03/2024] | 9 |

Getting Started

Textbook

An Integrated Approach to Software Engineering, Third Edition by Pankaj Jalote

<https://www.cse.iitk.ac.in/users/pankajjalote/OldSEbookSite/>

Syllabus

- ★ Introduction to Software Engineering
- ★ Software Processes
- ★ Requirements Engineering
- ★ Software Architecture
- ★ Planning and Design
- ★ Coding
- ★ Testing
- ★ Software Project Management
- ★ Advanced topics like Formal Methods in Software Engineering (Optional)

Grading

Exam - 30%

Project - 70% (Multiple phase evaluation. To be done in groups of 4)

TAs

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Group Members and Project Preference [Due on 16/01/2024]

Please form groups of 3 or 4 students. Enter your group members and project preference [here](#).

Academics

- ★ Course Registration and Grade Management System (A01)
- ★ Teaching Assistant Management System (A02)
- ★ Library Book Management System (A03)
- ★ Staff Recruitment System (A04)
- ★ Hostel Room Management System (A05)
- ★ Leave Management System for Staff and Students (A06)
- ★ Publication Management System (A07)

Travel

- ★ Carpooling Software (T01)
- ★ Cab Fleet Management System (T02)
- ★ Navigation System (T03)
- ★ Bus Tracking System (T04)

E-commerce

- ★ E-commerce Website (E.g. Amazon, Flipkart) (E01)
- ★ Free Classified Website (E.g. OLX) (E02)
- ★ Auction System (E03)
- ★ Hotel Room Booking System (E04)
- ★ Product Review Management System (E.g. Amazon reviews) (E05)
- ★ Hotel Reviews Management System (E06)

Social Media

- ★ Photo management system (E.g. Google photos) (SM01)
- ★ Online social networking system (E.g. Facebook, Twitter, LinkedIn) (SM02)

Healthcare

- ★ Electronic Health Record Management System (H01)
- ★ Medical Reports Management System (H02)
- ★ Social Media for Healthcare Professionals (H03)
- ★ Social Media for Medical Question Answers (H04)

Evaluation

Course Exam

April 10th or 12th

Review 1 (SRS & Architecture)

Each group has a total 20 mins for presentation. 15 mins for presentation and 5 mins of QA. Please prepare your slide only based on your submitted report. Your grades will be based on these reviews.

Please submit your slide in Google classroom. All presentations will be done from the provided laptop only. Submit your slide as R1GroupXY.pdf or R1GroupXY.ppt, where XY is your group number. Only one member from each group should submit the slide.

20th Feb (Tuesday)

- Group 1, 2, 3 (11 am -12 pm in A-117)
- Group 4, 5, 6 (12 pm -1 pm in A-117)

21st Feb (Wednesday)

- Group 7, 8, 9 (2:30 pm - 3:30 pm in A-117)
- Group 10, 11, 12 (3:30 pm - 4:30 pm)

23rd Feb (Friday)

- Group 13, 14, 15 (10:00 am - 11:00 am)
- Group 16, 17, 18 (11:00 am - 12:00 pm)

Review 2 (Design & Test Plan)

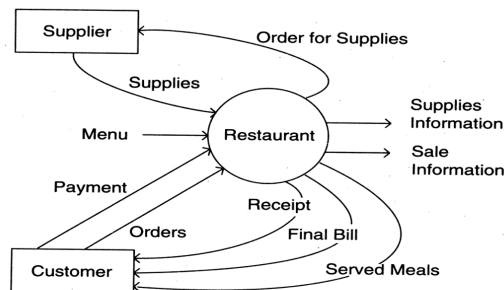
Will be done during April 1st week.

Review 3 (Software Demo & Test Report)

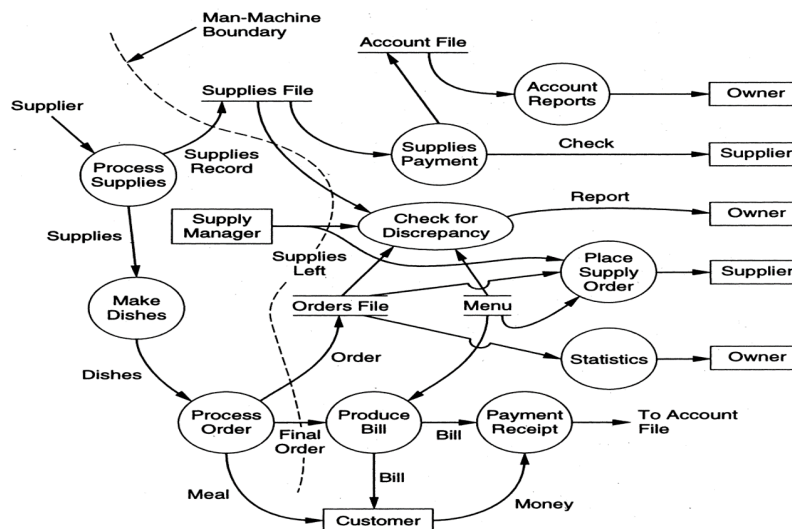
Will be done during April 3rd or 4th week.

[30 Points] Software Requirement Specification [Due on 28/01/2024]

- Only one member of the group should do the submission. It should have two parts: Software Requirement Analysis (SRA) and Software Requirement Specification (SRS). Submit them as “SRA Group XY.pdf” and “SRS Group XY.pdf” (E.g. SRA Group 01.pdf, SRS Group 01.pdf).
- In SRA you need to submit: (a) context diagram, (b) Two possible DFDs of the proposed system along with the man-machine boundary (if any), (c) expected size of your code based on function point analysis. You need to give a brief description of your DFDs. You need to state which DFD you plan to use and why it is better than the other. Include details of how exactly you did the function point analysis.
- [Here](#) are a few sample SRS.



Context Diagram



Sample DFD with man-machine boundary

[30 Points] Software Architecture [Due on 15/02/2024]

Submit an architecture design document for your software. Only one member of the group should do the submission. Please refer to Ch. 4 slides 51-54 to see what to include in your architecture design document. Your report must contain the following:

- At least two possible architectures (i.e., component and connector views) of your proposed system. Both the architectures should be of good quality. If your baseline architecture is of low quality, then marks will be deducted.
- Which architecture style, taught in the class you plan to use (or extend) in your project? Give justifications.
- Use ATAM to analyze and compare the proposed architectures. Give justification of which architecture is the best.
- Evaluate the non-functional attributes, as taught in the class (see slide 55-67).
- You can see some samples [here](#). These samples are not ideal and are just for illustration. You need to create the document based on what was covered in the class.
- Submit it as "SA Group XY.pdf" (E.g. SA Group 01.pdf, SA Group 11.pdf).

No extension for the deadline will be given. We will deduct 10% marks of the assignment for each day of delay after the deadline.

[30 Points] Software Design [Due on 08/03/2024]

Submit a high-level design document for your software. Your report should contain the following sections:

Overview

- ★ 2-3 paragraphs describing the goal of your software and an overall summary of the design document.

Data Flow Diagrams

- ★ DFD for your system
- ★ Most abstract input (mai) and most abstract output (mao)

Structured Charts

- ★ First level factored modules
- ★ Factored input modules
- ★ Factored output modules
- ★ Factored transform modules
- ★ Final structured chart showing all the modules

Design Analysis

- ★ Name of all your final factored modules, its type (input, output, coordinate, etc), type of cohesion (functional, temporal, etc), estimated size of the module (show in the form of a table)
- ★ For each module, 1-2 sentences justifying the type of cohesion it has and also its degree of coupling with other modules.
- ★ Count of total number of input, output, coordinate, transform and composite modules in your final structured chart. (show in the form of a table)
- ★ Identify the most complex or error prone module in input, transformation and output subsystem. Also explain why you feel these modules are most complex or error prone.
- ★ List the top-3 modules, along with counts, in terms of fan out and fan in?
- ★ Total expected size of your software in terms of LoC. Total LoC for input, transform and output subsystems.

Detailed Design Specification

- ★ Interface of all the final level factored modules.
- ★ Show it in the form of classes with attributes and methods.

You can see a few samples [here](#). These examples are just for illustrative purposes. They are not detailed enough and don't have the contents asked above. Submit your report as "SD Group XY.pdf", where XY is your group number. No extension for the deadline will be given. We will deduct 10% marks of the assignment for each day of delay after the deadline.

[30 Points] Test Plan [Due on 25/03/2024]

Please submit a tentative test plan for your software. You will again submit the final test plan and test report later on after completing your coding and executing the test cases. This tentative test plan will help you during the coding phase with better understanding of what is actually expected at the end. You are required to perform functional testing. If you wish, you can also perform structural testing. Some extra marks may be given for doing structural testing. During the testing phases, it is recommended to use softwares such as [Jira](#) for defect logging and tracking. Your report should contain the following sections.

Test Overview

- ★ List of all operations/modules that you plan to test

Test Details

- ★ Unit tests for the modules
- ★ Integrating testing
 - The order in which you will integrate your modules and test cases for integrated modules.
- ★ System testing
- ★ Structural tests (optional)
- ★ Performance test
- ★ Stress test (optional)

Test Analysis

- ★ We discussed the following seven types of black box testing in the class: equivalence class partitioning, boundary value analysis, cause-effect graphing, pair-wise testing, special cases, error guessing and state based testing. Which of these methods did you use for generating the test cases, for which modules and the count of test cases. Report this functional test summary in the form of a table.
- ★ Structural test plan/report (optional)
- ★ Performance test plan/report
- ★ Stress test plan/report (optional)

You can see a sample [here](#). This example is only for illustrative purposes. Please prepare your test plan report based on what is given above. Submit your report as "TP Group XY.pdf", where XY is your group number.