Project
SWE 312 - 2022/23 Term 3

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You have to read the whole document before starting the work

1 Objectives

The main objective of this project is to give students the opportunity to apply the knowledge acquired during classes in a software development project of a reasonable size in order to improve their skills.

The system to be developed is described in section 6

2 Organization

The work is subdivided into two phases called Phase 1 and Phase 2. Table 1 summarizes the deliverables of each of these phases.

	.	**Deliverable**
Phase 1 (Deadline individual: April 27 team: May 4)	A	System Boundary Diagram
	B	Use Case Diagram (Technical tool)
	C	Five (non-trivial) use case descriptions (use template)
	D	The list of ALL functional requirements for the system
	E	The list of ALL nonfunctional requirements and ALL design constraints for the system.
Phase 2 (Deadline individual: May 25 team: June 1)	A	Sequence Diagrams for four use cases (Technical tool)
	B	Mockup screens for four use cases [basic flow only] (Technical tool)
	C	Class Diagram for four use cases (Technical tool)
	D	Activity Diagrams for two use cases (Technical tool)
	E	Updated Phase 1 Deliverables (A-E)

Table 1: Phases deliverables

3 Details of Phase 1

1. Use the SRS (Software Requirements Specification) template (available on LMS), the cover page must include group number, section number, student's names with their IDs.

2. Before filling up the SRS document read its instruction page carefully (available after the cover page within the same document).

3. In the Introduction section include Purpose, Scope, Definitions, Acronyms, Abbreviations and References and Overview, all the fields have been explained in the template.

4. Write a complete list of functional requirements for the proposed system. The requirements must be errors free and complete.

    - For each requirement concerning a generation of a report, you have provide the form and the content of the generated report along with a concrete example of such report.

5. Develop a use case diagram (all use cases) using any tool (Example: www.umlet.com). Hand drawn diagrams are not accepted.

6. Select five non-trivial use cases and provide their use case description (Name, Description, Actors, Precondition,Relationships, Basic flow and One alternative flow). Avoid trivial use cases like login, logout, and register. Focus on use cases that are specific to the system to be built.

7. Write a complete list of nonfunctional requirements for the proposed system. The requirements must be errors free and complete.

8. Write the design constraints and ethical and professional issues as explained in the template.

Note: Document organization is a must, each topic must have a title, English must be correct, diagrams must be readable and document format must be consistent.

Marks distribution

Task	Marks
Introduction	1.5
Functional, non-functional requirements and Design Constraints	4
Use Cases Diagram, Use case description	4
Report organization,	0.5

4 Details of Phase 2

1. Use the SRS template.
2. Select four use cases among the five that you worked on in Phase 1. For each of these use cases, produce the following:
   (a) a sequence diagram (consider only the basic flow)
   (b) mockup screens (use a tool like www.mockflow.com and moqups.com, hand drawn mockup screens are not accepted)
3. Produce a class diagram that covers the realization of the four selected use cases (specify relationships, association name, multiplicity, needed attributes and operations).
4. Select two use cases among the four selected previously and produce an activity diagram for each one of them (showing the swim-lanes (partitions)).
5. It is mandatory to use a UML modeling tool to draw all the diagrams (like www.umlet.com). Hand drawn diagrams are not accepted.

Note: Document organization is a must, each topic must have a title and English must be correct, all diagrams must be readable.

Marks distribution

Task	Marks
Sequence diagrams	4
Mockup screens	1
Class diagrams	3
Activity diagrams	2

5 Work submission

5.1 Phase 1

- EACH student has to work INDIVIDUALLY on the phase as stated in section 3 and produce a SRS as stated there.
  No communication with the other team members is allowed here.
- The team organizes meetings to produce a UNIQUE COMMON version of the SRS.
- No later than Thursday, April 27, 2023,
  - EACH student has to share his individual SRS (in both DOCX and PDF formats) on `Google drive` with `mohsen.denguir2@gmail.com`
    The submitted files must be named
    `swe312-s23-project-phase1-t<team number>-<student ID number>.docx`
    and `swe312-s23-project-phase1-t<team number>-<student ID number>.pdf`
    Example: `swe312-s23-project-phase1-t99-12345678.docx`
    and `swe312-s23-project-phase1-t99-12345678.pdf`
- No later than Thursday, May 4, 2023
  - The team leader has to share the common version of the SRS (in both DOCX and PDF formats) on `Google drive` with `mohsen.denguir2@gmail.com`.
    The submitted files must be named `swe312-s23-project-phase1-t<team number>.docx`
    and `swe312-s23-project-phase1-t<team number>.pdf`
    Example: `swe312-s23-project-phase1-t99.docx`
    and `swe312-s23-project-phase1-t99.pdf`

5.2 Phase 2

- EACH student has to work INDIVIDUALLY on the phase as stated in section 4 and produce a SRS as stated there.
  No communication with the other team members is allowed here.
- The team organizes meetings to produce a UNIQUE COMMON version of the SRS.
- No later than Thursday, May 25, 2023,
  - EACH student has to share his individual SRS (in both DOCX and PDF formats) on `Google drive` with `mohsen.denguir2@gmail.com`
    The submitted files must be named
    `swe312-s23-project-phase2-t<team number>-<student ID number>.docx`
    and `swe312-s23-project-phase2-t<team number>-<student ID number>.pdf`
    Example: `swe312-s23-project-phase2-t99-12345678.docx`
    and `swe312-s23-project-phase2-t99-12345678.pdf`

- No later than Thursday , June 1, 2023,
  - The team leader has to share the common version of the SRS (in both DOCX and PDF formats) on `Google drive` with `mohsen.denguir2@gmail.com`.
    The submitted files must be named `swe312-s23-project-phase2-t<team number>.docx` and `swe312-s23-project-phase2-t<team number>.pdf`
    Example: `swe312-s23-project-phase2-t99.docx` and `swe312-s23-project-phase2-t99.pdf`

Important

For each phase, and before starting the work, the team has to agree on the following:

- the schedule of the meetings that will be dedicated to the production of the common deliverable.

Timeline

March 26	Start individual work on Phase 1
April 27	Submit individual SRS for Phase 1 Start team work on Phase 1
May 4	**Submit team SRS for Phase 1** Start individual work on Phase 2
May 25	Submit individual SRS for Phase 2 Start team work on Phase 2
June 1	**Submit team SRS for both Phase 1 and Phase 2**

6 System description: Payroll Management System

As the head of Information Technology at SuperTech, Inc., you are tasked with building a new payroll management system to replace the existing system which is hopelessly out of date. SuperTech needs a new system to allow employees to record timecard information electronically and automatically generate paychecks based on the number of hours worked and total amount of sales (for performance employees).

The new system will be state of the art and will have a mobile phone interface to allow employees to enter and submit timecard information, enter purchase orders, change some employee preferences (such as payment method), and create various reports. The system will run on individual employee phones and tablets throughout the entire company. For reasons of auditing, employees can only access and edit their own timecards and purchase orders.

The system will retain information on all employees in the company (SuperTech currently has around 7,000 employees worldwide). The system must pay each employee the correct amount, on time, by the method that they specify (see possible payment methods described below). SuperTech, for cost reasons, does not want to replace one of their legacy databases, the Work Management Database which contains all information regarding projects and charge numbers. The new system must work with the existing Work Management Database which is an Oracle database The Payroll System will access, but not update, information stored in the Work Management Database.

Some employees (hourly employee) work by the hour, and they are paid an hourly rate. They must submit timecards that record the date and number of hours worked for a particular work load (no more than 8 hours daily). Hourly workers are paid every Saturday

Salaried employees are paid a flat salary. Even though they are paid a flat salary, they submit timecards that record the date and hours worked. This is done so the system can keep track of the hours worked against particular work load. They are paid on the first workday of the next month.

Employees can login to the system using their email addresses and passwords and they can only make changes to the timecard for the current pay period and before the timecard has been submitted. The system retrieves and displays the current timecard for the employee. If a timecard does not exist for the employee for the current pay period, the system creates a new one. The start and end dates of the timecard are set by the system and cannot be changed by the employee. If the timecards are submitted, the system makes the timecard read-only.

Performance employees receive a commission based on their sales. They must be able to maintain purchase orders, which includes adding, changing, and canceling purchase orders. To add an order, performance employees need to submit a purchase order that reflects the date, purchased products, and amount of the sale. It should also contain customer point of contact and customer billing address. The system is responsible for determining the commission rate for each employee, and it is one of 10%, 15%, 25%, or 35%. Also, the system will generate and assign a unique purchase order number to the purchase order, which will be provided to the performance employees as a purchase reference. This unique

number can be used later by the performance employees to update their orders' information, as well as, to cancel it.

One of the most requested features of the new system is employee reporting. Employees will be able to request the system for the total hours worked, totals hours worked for a particular project, total pay received year-to-date, or remaining vacation time (vacation / sick leave), etc. In order to create these reports they need to indicate the type of the report, information related to each type, begin and end date of the report and the system will provide the report that satisfies the specified criteria. Employees may then request to print the report.

Employees can choose their method of payment. The payment method controls how the Employee will be paid. They can request direct deposit and have their paycheck deposited into a specific bank account of their choosing. Also, They may choose to directly pick their paychecks up at the office.

SuperTech Payroll Administrator can maintain employee information after he logs in to the system. He is responsible for adding new employees, deleting employees and changing all employees' information such as name, social security number, phone number, payment classification (hourly, salaried, performance), salary (for salaried and performance employees), hourly rate (for hourly employees), commission rate (for performance employees), tax deductions and other deductions.

Furthermore, the Payroll Administrator can run administrative reports. He can request to create either a "Total Hours Worked" or "Pay Year-to-Date" report. And in order to complete the request for those reports, the administrator must specify the following report criteria: the report type, employee name, begin and end dates for the report.

The payroll application will run automatically every Saturday and on the first working day of the month to generate the paychecks. It will pay the appropriate employees on those days. The system calculates the pay using entered timecards, purchase orders, employee information and all legal deductions. The system will be told what date the employees are to be paid, so it will generate payments for records from the last time the employee was paid to the specified date. The new system is being designed so that the payroll will always be generated automatically, and there will be no need for any manual intervention. Moreover, the system shall interface with existing bank systems via an electronic transaction in order to complete the deposit of the generated paychecks.

The main system must be running most of the time. It is imperative that the system be up and running during the times the payroll is run (every Saturday and the first working day of the month). Also, the system shall simultaneously support a large number of users against the central database at any given time.

Additionally, the system should prevent employees from changing any timecards other than their own. Finally, only the Payroll Administrator is allowed to change any employee information with the exception of the payment delivery method.

Glossary

The glossary contains the working definitions for the key concepts in the SuperTech Payroll Management System:

- **Bank System**: Any bank to which direct deposit transactions are sent.
- **Employee**: A person who works for the company that owns and operates the payroll system (SuperTech, Inc.)
- **Payroll Administrator**: The person responsible for maintaining employees and employee information in the system.
- **Work Management Database**: The legacy database that contains all information regarding projects and charge numbers.
- **System Clock**: The internal system clock that keeps track of time. The internal clock will automatically run the payroll at the appropriate times.
- **Pay Period**: The amount of time over which an employee is paid.
- **Paycheck**: A record of how much an employee was paid during a specified Pay Period.
- **Payment Method**: How the employee is paid, either pick-up, or direct deposit.
- **Timecard**: A record of hours worked by the employee during a specified pay period.
- **Purchase Order**: A record of a sale made by an employee.
- **Salaried Employee**: An employee that receives a salary.
- **Performance Employee**: An employee that receives a salary plus commissions.
- **Hourly Employee**: An employee that is paid by the hour.