OBJECT ORIENTED PROGRAMMING PROJECTS 2019

Contents

Common Requirements

- Your project must implement all OOP concepts: Encapsulation, Abstraction, Inheritance and Polymorphism.
- Your program must be divided into PROCs, each of which is responsible for one and only one functionality
- Keep your code clean, follow a specific convention, and choose meaningful identifiers (variables and methods names).
- Note that: Bonus items will not be counted unless the original project is complete.

❖ **Deliverables for all projects:**

- A System with GUI that fulfills the mentioned requirements.
- All projects must be submitted with a printed documentation and a softcopy of your project source code on a CD.
- Project documentation should include:
  - The project name.
  - The team members' info (ID, name and section number).
  - A flowchart of your logic.
  - A UML class diagram for the project.

❖ **Team members:**

- For **General** department: **3 – 5 members per team**.
- For **Bio and SW** departments: **3 – 4 members per team**.

❖ **Teams Submission Forms links for each department:**

- Use the links below to submit your team members' information.
- Please make sure that you are in the right department's form as submitting in the wrong department will not be counted.
- **Note that, the submission will be closed on Friday 15 of March at 9 pm .**

General Department	https://goo.gl/forms/ndUpT4FQvF5mgIyk1
BIO Department:	https://goo.gl/forms/xJhUx99QbLVJpJCh2
SW Department:	https://goo.gl/forms/On9OPlUiIeiknaXZ2

- **Project ideas registration Forms links for each department:**
  - After registering your team, you will get your team ID, memorize it.
  - Please note that each team will be able to register for only one idea and only once, means that once you submitted your selection you will not be able to update nor submit again.
  - Each idea will have maximum number of teams to register in, once an idea is full it will be closed, and no more teams will be able to select it.
  - Use the link below to register in a project idea.

    https://goo.gl/forms/3m6kBYrPwrchvq8A3
  - **Note that, the form will be opened on Wednesday 20 of March at 9 pm and it will be closed at Friday 22nd of March at 9:00 pm.**

1. Engineering Enterprise Payroll System

Description

- A system for managing the data of employees at a company and generating payroll process for each one.
- An employee should have these attributes: ID, name, age and salary.
- There are 2 types of employees: "engineer and trainee".
- An engineer should have these attributes: working hours and a grade.
- Grade has position, tax rate and pay rate.
  - The salary of an employee is calculated using working hours, pay rate and tax rate.
  - Pay rate and tax rate are assumed according to the position of each employee (Manager, team leader, team member…..).
- A trainee should have: a university name, GPA and academic year.
  - The salary could be fixed for trainees.
- **System Functionalities:**
  - Adding new engineer.
  - Edit existing engineer.
  - Delete engineer.
  - Calculate salary.
  - View all engineers with all their data and salaries.
  - Adding new trainee.
  - Edit existing trainee.
  - Delete trainee.
  - View all trainees with all their data and salaries.

Mentor

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[Bonus]

- Using files to manage the data in all the required functions.
- Extra complicated functionalities.
- Powerful GUI.

2. Healthcare Management System

Description

- System users can be patients, doctors or admin.
- Each user has a username, mail and password.
- Each Patient has address, phone number, gender, symptoms, payment method and diagnosis.
- Each doctor has address, phone number, and specialty in medicine.
- **System Functionalities:**
  - **Admin can:**
    - Add new doctor.
    - Add new patient.
    - Edit existing doctor.
    - Edit existing patient.
    - Delete doctor.
    - Delete patient.
    - Display all doctors.
    - Display all patients.
  - **Doctor can:**
    - Edit his information.
    - Fill diagnosis of a patient.
    - Display his patients.
  - **Patient can:**
    - Edit his information.
    - Display all doctors.
    - Make an appointment with specific doctor.

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[Bonus]

- Using files to manage the data in all the required functions.
- Extra complicated functionalities.
- Powerful GUI.

3. Online Book Store Management System

Description

- A system for managing online shopping of books.
- A user should have a username, a mail and a password.
- There are 2 types of users: Admin and reader.
- A reader should have: a phone number, an address and a payment method.
- A book should have a name, an author, a price and a category.

- **System Functionalities:**
  - **Admin**
    - Add new book.
    - Edit existing book.
    - Delete book.
    - Add new reader.
    - Edit existing reader.
    - Delete reader.
    - Display all reader.
    - Display all books.
  - **Reader**
    - Edit his information.
    - Search for a book and order it.
    - Display all books.

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[Bonus]

- Using files to manage the data in all the required functions.
- Extra complicated functionalities.
- Powerful GUI.

4. Hotel Management System

Description

- Hotel management system is a desktop application that will allow hotel workers to do their work easily. It will help for booking rooms, client check in and check out, and keeping up with rooms' status.
- The residents of the hotel has an ID, name, the duration to be spent in the hotel, his room information, the services he will get and the cost of his accommodation.
- This cost will be calculated based on the type of room that he is staying in, number of nights that he will spend at the hotel and the services he got during his accommodation.
- Hotel has different types of employees such as: manager, receptionist, room service.
- Each employee has: ID, name, salary and job title.
- Only the manager and the receptionist have the accessibility to this application. So, each employee has specific functionalities and limited accessibility.
- The hotel contains different types of rooms (single, double and triple) with different prices.
- There are some services that can be offered to the resident such as: breakfast, lunch and dinner, and each one of these services have its own price.

- **System Functionalities:**
  - **Manager can:**
    - Sign in with his user name and password.
    - Add, edit and delete new employees.
    - View employees' details.
    - View details of all residents.
    - Get information about the income (weekly, monthly or annually)
    - Follow up with the status of different types of rooms (both available and busy rooms).
  - **Receptionist can:**
    - Add, edit and delete residents' information.
    - Assign the resident to a room based on availability of the rooms.

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[Bonus]

- Saving input data by using either data base tools or using simple files system to save all recorded inputs and reloading them at the beginning of the program.

5. School management system

Description

- School management system is a desktop application which helps school manager to do his works easily in some management works like managing Academic years, classes, courses, teachers and students.
- School has a fixed number of classes and each class is assigned to a specific academic year:
  - Each class has students.
  - Each class has teachers who teach in this class.
- Each student has: ID, name, age, academic year, grades of the previous years and the class at which he/she has been assigned to.
- Each teacher has his personal information like: - ID, name, age, salary, graduation degree, graduation year, years of experience, subject he teaches.
- A teacher can be a supervisor for a subject according to his number of years of experience.

  For example, teacher who has the longest experience in his subject will be a supervisor for a specific academic year.
- A Supervisor should supervise only one subject in one academic year.
- There are 6 subjects in each academic.
- This application allows the manager to:
  - Sign in with his\her user name and password.
  - Add, edit, delete and view teachers' information.
  - Assign teachers to classes, according to teacher availability in class time.
  - Add or remove supervisor for subject in each year.
  - Add, edit, delete and view students' information.
  - Change student's class.

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[Bonus]

- Saving input data by using either data base tools or using simple files system to save all recorded inputs and reloading them at the beginning of the program.

6. Travel management system

Description

- The travel management system enables employees in any travel agency to manage trips and tours which are organized by the company.
- There are different categories of trips, like: Safari holidays, Adventure tour, Culture trip, Religious tour.
- Each Tour trip consists of:
  - Trip date.
  - Trip category.
  - Trip name.
  - Tour guide.
  - Number of tourists who can join this tour.
  - Total number of tourists who joined this trip and their personal information.
  - The details of the sites that the tourists will visit.
  - Price of the trip
  - The total profit which came out of this trip.
- Each tour guide has: ID, name, age, salary and information about the trips to which he is assigned to before.
- Each client has his personal information plus information about trips he has.
- Client's trips can be divided into previous trips, current trip (if he is in a trip now), and coming trips (trips that doesn't start yet).
- This application should enable the employee to:
  - Add, edit or cancel any tours or trips organized by the company.
  - Add, edit, delete and view tour guide information.
  - Assign each tour guide to specified tour based on his availability.
  - Add, edit, delete and view personal details of clients.
  - Cancel client's coming trip if the client wants that.
  - Postpone a client's trip if there is another trip to the same site that will take place soon.
  - Calculate the total profit for each category of trips separately.
  - Finally, he can get the total profit of all trip categories.

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[Bonus]

- Saving input data by using either data base tools or using simple files system to save all recorded inputs and reloading them at the beginning of the program.
- Add and View image album for the trips' sites.

7. Bug Tracking System

Description:

- Bug tracking system is essentially and effectively implemented to monitor the status of bugs in an application.
- All the bugs that are identified in a certain project are stored in a database.
- Each bug has a unique bug id, status and the details of the person who is responsible for it and the project that was found in.
- Bugs can be created and updated easily.
- This application is divided into following modules:
  - Project Manager/Admin
  - Developer
  - Tester

- **Project Manager/Admin**
  - Admin can add new user or can update the permission of existing users (Developer/Tester).
  - Creates the project and add users to it.
  - Creating bug and assigning it to a tester.
  - View the project/bugs progress assigned to particular employee.

- **Developer**
  - View list of pre-assigned projects and bugs.
  - Responsible for updating bug status.
  - Reset and edit his information like username and password.

- **Tester**
  - View list of assigned projects/bugs.
  - Create and update the bug status.
  - Assign bug to a particular developer.

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[Bonus]

- View analytics chart for the bugs.

8. Car Sales System

Description:

- Car Sales system is an application that computerizes the conventional car sale procedure which we are aware of. This helps in managing data related to buyers and sellers of the cars.
- This application is divided into following modules:
  - Addition/Deletion of Cars and their details.
  - Viewing and update details
  - Searching for a car.
  - Buying a car.

- **Addition/Deletion of Cars and their details**
  - System shall allow the administrator to login and add data related to cars.
  - He will also be able to delete old data related to cars.
  - Admin has the permission to add, edit and delete data.
  - Shall be able to save list of cars.

- **Viewing details**
  - View the saved list of cars.
  - View all details of a car like year of purchase, manufacturer type, model name, available colors, ...

- **Searching for a car**
  - Search for cars based on matched keywords such as cost, year of manufacture etc. and view their details.

- **Buying a car**
  - User shall sign up to use the system or login if he/she has an account.
  - User can view list of cars.
  - User can select one of the cars and buy it.

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[Bonus]

- Add image to each car and display it when you search for that car.

9. Automated Time Table Generator

Description

- Develop an application that generates a timetable for a school/college without any scheduling overlaps existing.
- Basic Entities: Courses, Teachers, Rooms:

Courses Details:

- Each course has an id, name.
- Courses consist of lectures and labs.
- Each lecture/lab in a course is assigned a teacher
- Each lecture/lab is assigned a room
- Each lecture/lab has an assigned number of hours.

Teachers Details:

- Each teacher has an id, phone, email
- Teachers can be assigned more than one lecture/lab

Rooms Details:

- There are classrooms and laboratories.
- Room scheduling cannot overlap.

- The interface should allow the user to:
  - Input number of courses with their details.
  - For each course, define the number of lectures, labs
  - Input the number of rooms, their details.
  - Assign teachers and rooms to each lecture/lab.

- The output should be a timetable with no scheduling overlap.
- In cases of an overloaded schedule and no available time slot, the system should notify the user to change room/teacher.

Suggested Outcome (You can adjust the design as you wish ☺):

	8-9	9-10	10-11	11-12	12-1	1-2
Sat	Room1-Teacher1-Course1	Room1-Teacher1-Course1				
	Room2-	Room3-				

	Teacher2-Course1	Teacher3-Course2				
Sun						
Mon						
Tues						
Wed						
Thurs						

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[Bonus]

- Adding GUI to separate schedule display according to each entity:
- Example:
  1. Table from point of view of specific teacher.
  2. Table from point of view of specific room.
  3. Table from point of view of specific course.

- Developing an efficient method to improve solving schedule conflicts (example: Add priority feature to a lab or a lecture, .. etc).

10. Crime Management System

Description

- Develop a crime management system for police stations that allows adding, updating case files and criminal records.
- Basic Entities: Departments, Cases, Police Officers, Criminals:
  - **Department Details:**
    - Each department has an ID, name and date of activation.
    - Each department has a list of officers in that department.
    - Each department has a list of its cases.
  - **Case Details:**
    - Each case has an ID, description and Start date of working on it and the date of last updates on the case.
    - Each case has a crime type (Murder/Robbery/Assault,..).
    - Each case belongs to a department.
    - Each case has officers assigned to it.
    - Each case has criminals involved in it.
  - **Police Officer Details:**
    - Each Police Officer has an ID, Name, Phone and Salary.
    - Each officer belongs to a department.
    - Each officer has a list of cases they handled.
  - **Criminal Details:**
    - Each criminal has an ID, name and current location.
    - Each criminal has a list of crimes they committed.
    - Each criminal has danger level (Low, Moderate, High, Very High).
- The interface should allow users to:
  - Add Departments, Cases, Officers and Criminals.
  - Only allow officers in the department that handles a case to Update or Display a case record (use authentication for officers).
  - Only allow officers in the department that handles a case involving a criminal to Update or Display a criminal record.

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[Bonus]

- Powerful GUI
- Adding relevant features such as (criminal profiling, officer performance evaluation, … etc.).

11. Monopoly Game

Description

- The rules are the same as the standard monopoly game:
  - The board consists of a number of fields (cities, train stations, chances, etc).
  - The game starts by all players having the same amount of money, waiting at the GO field
  - Each player gets a turn and buys properties by their listed prices.
  - If a player arrives at another player's property, they have to pay the rent.
  - The game ends when one player remains the only one with money.
- Basic Entities: fields, Groups, Properties (أملاك), Players:
  - **Fields Details:**
    - The board consists of a number of fields.
    - Each Field has a fixed position on the board.
    - Fields can be properties (cities) or chances.
  - **Group Details:**
    - Each group consists of two to three properties.
  - **Properties Details:**
    - Each property has a listed price.
    - Each property belongs to a group.
- 4-Players Details:
  - All players should start the game at the GO field.
  - Each player starts the game with the same amount of money.
  - Each player has a current position (on a field).
  - Each player has a number of properties they bought.
  - When a player stops at another player's property they should pay rent.
- The interface should allow players to:
  - Decide the number of players.
  - Choose whether to buy properties or not.
  - Choose whether to pay rent or leave the game.

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[Bonus]

- Save and Load game info and states of players
- Adding meaningful relevant features to the game such as (houses, hotels,..etc).

12. E-Government System (offline)

➢ Description

The E-Government system is an efficient, effective and public service capable of adjusting any changes in the government structure, managing resources wisely, providing distinguished services to citizens and continuously interacting with them.

- Our small Government system will consist of 4 Ministries:
  1. Ministry of Education
  2. Ministry of Finance (وزارة المالية)
  3. Ministry Electricity and Energy
  4. Ministry of Health and population
- Each ministry has some departments.
- There is exactly one minister for each ministry and many employees work in the different departments of each ministry.
- There are forms in each department that the citizen can fill to have the service that he/she requires from the e—government system.
- At first, to start the system you should sign in (using user name and password) either as the system owner or as a citizen (normal user).
- The owner should be able to:
  1. Add new Ministry.
  2. Edit existing ministry (add/remove department in it or change the ministry information).
  3. Remove existing ministry.
  4. Add/Remove employees working in the different departments.
  5. Add/Remove a form to a specific department.
  6. Get count of existing ministries.
  7. Get count of citizen registered to the system.
- The normal user (citizen) should be able to:
  1. Register for new account (if he is not registered).
  2. Have different services from each ministry as following:
     - Ministry of Education: contains 3 departments for stages (primary, preparatory, secondary). Citizen can check last year's exams question papers.
     - Ministry of Finance: Citizen can check today's currency prices (exchange rates)
     - Ministry of Electricity: Citizen can check his electricity bill and can pay it online by visa.
     - Ministry of Health and population: Citizen can search for a specific type and quantity of blood bags (A+, A-, B+, …. etc) and get the location of the blood bank to get it from.

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➢ [Bonus]

- Saving input data by using either data base tools or using simple files system to save all recorded inputs and reloading them at the beginning of the program.

13. Import and Export System

Description

IO System is a system to Import cases data and convert those cases to managers then take actions after that export those cases. cases can convert to more than one manager

- This application has the following modules:
  1. Come Cases
  2. Outgoing Cases
  3. Managers
  4. Cases Actions
  5. Cases Transactions

- Functions:
  1. Add/ Edit/ Delete Come Cases, Outgoing Cases, managers, Cases Actions, Cases Transactions.
  2. Can assign cases to managers
  3. Manager can add actions to cases
  4. Manager can convert case to another manager
  5. Can close/ finish case
  6. Can export cases

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[Bonus]

- Powerful GUI

14. Tic Tac Toe Game

Description

- This game is very popular and is simple by itself. It is a two players game. In this game, there is a board with 3 x 3 squares. The goal of Tic-Tac-Toe is to be one of the players to get three same symbols in a row - horizontally, vertically or diagonally - on a 3 x 3 grid.
- For the option human, both the players are human and for the option computer, the first player is human, and the second player is computer.
- Also, the game has multiple levels of difficulty (easy, medium, hard).
- Only mouse interface is implemented, keyboard is not activated in the game.

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[Bonus]

- Powerful GUI

15. Violation System

Description

Violation System is a system to detect violation in buildings then record them in List of violation after that make appointment to judge for each violation in hearing committee place.

- This application has the following modules:
  1. Violation Data
  2. Violation Data Details
  3. Inspectors
  4. Committee Members
  5. Appointment
  6. Hearing Committee

- Functions:
  1. Add/edit/delete violation, Violation Data Details, Inspectors, Committee Members, Appointment and Hearing Committee to each violation
  2. After creating appointment to violation then this violation not appear in list of current violation
  3. Assign Fined to Violators or Not in hearing committee
  4. After creating hearing committee to violation then this violation not appear in list of appointment

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[Bonus]

- Attach image to violation buildings
- Powerful GUI.

16. Art Gallery Management System

Description

- Gallery keeps information about "Artist" such as their Name, Birthplace, Age & Style of Art.
- It also keeps information about the "Art Work", the Artist who made it, the year it was made, Unique title, Type of art & Prices must be stored.
- The piece of artwork is classified into various categories like Paintings, Work of the 19th century still life, Statues, etc.
- Gallery also keeps information about Customers like their name, Address, Total amount of Dollar they spent on Gallery by the items they bought.
- The user will have the ability to add Art Work items, see customer's information if he is signed in as the gallery's owner.
- If the user is signed in as a regular customer, he can purchase any item he likes.

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[Bonus]

- Adding different images for the Art Works.
- A search form that displays images of a searched category of the art works.

17. Movie Ticket Booking System

Description

- Customer who wants to book a ticket; first will have to login if they are already registered, if not then they will have to fill in details like user name, password, email, id and contact no.
- After successful registration, the signed user is redirected to new form in which user have to select the city. there will be a list of categories to choose from, if the user chooses a specific category, there will be a list of related movies.
- User can receive the information like movie description, release date about any movie by clicking info button.
- On clicking the movie button, the user is redirected to next form which shows the availability of tickets in different shows in different theater in the city which was chosen by the user.
- Then User can choose a ticket that belongs to specific theater then go to the payment process.
- On clicking confirm button a payment panel is made visible in which you will have to enter details of card(debit/credit) and name of the card holder then click on pay button.

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[Bonus]

- There will be 3D and 4D theater beside the ordinary one that user can choose from and they will have different prices.
- Display the purchase history for a customer.

18. Chess Game

Description

- The rules are the same as the standard chess game:
  - Chess is a game played between two opponents on opposite sides of a board.
  - The chess board contains 64 squares of alternating colors.
  - Each player has 16 pieces: 1 king, 1 queen, 2 rooks, 2 bishops, 2 knights, and 8 pawns.
  - The goal of the game is to checkmate the other king. Checkmate happens when the king is in a position to be captured (in check) and cannot escape from capture.

- Basic Entities: Board, Players, Pieces:
  - Board Details:
    - The board consists of several pieces.
    - Each piece has a fixed position on the board.

  - Players Details:
    - Has 16 pieces with white or black color (alternative with the other player)
    - Start move pieces to checkmate the other king.
    - The player with white color starts the play.

  - Pieces Details:
    - We have 6 different kinds of pieces (king, queen, rooks, bishops, knights, and pawns)
    - Each piece has different moves.

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[Bonus]

- Make one player vs Computer.

19. Bus Ticket Reservation System

Description

A system for bus ticket reservation is needed to be done for a traveling company, the main requirements are:

- Person class that has (National ID, Name, Gender, Position). Person may be:
  - Admin: that approves the trips.
  - Customer: that books the trip.
  - Driver: has trip schedule (No overlapping trips allowed).

- Trip class has (Departure time, Arrival time, Pickup location, Destination location, Bus class, cost).

- Bus Class that has (total seat number, Bus plate number). There are two types of bus classes:
  - Elite class (has 12 seats).
  - Classic class (has 24 seats).

- Functions:
  - Booking a new reservation
  - Edit existing reservation (number of seats or changing destination)
  - Delete reservation.
  - Change Trip status (Delay, Arrived, Departure).
  - Display the details of the reservation.

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[Bonus]

- Make a list of reservations for the same customer.
  - Make sure that there is no overlapping.

- GUI the seats and when clicking on them the seat is chosen
  - Name the seats as (A1, A2, A3) for example.

20. Graph Drawing

Description

As we know that the Graph concept is a very effective concept in Mathematics field and for this importance it becomes a separated field from Mathematics called Graph Theory and this is used widely in solving the Development Problems, Simulating Network Problems , Machine Learning Problems and IOT etc…., so we seek to visualize any graph problem about sending the type of graph, the vertices , the edges and the weights , etc…. to the system. Then the system shall process these received data and shows visualized graph for these data and enable the user to choose some edges from the graph then the system is coloring them and resulting their total sum of weights.

- According; there are various types of graph we may apply that only on Directed Graphs.

- Functions to deliver:

  - Create_Graph
  - Add_New_Vertex/Vertices
  - Delete_Vertex/Vertices
  - Delete_Edge
  - Update_Weight/Weights
  - Show_Graph
  - Show-Sum-Of-Some-Weights
  - Clear_Graph

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[Bonus]

- Applying more Types of Graphs.

21. Online Shopping System

Description

- It a software to simulate the full cycle of the shopping. It begins from customer/user entrance the to the system and if it's his/her first time of using this system then he/she should fill his/her personal info, the SSN and the credit card number. Then he/she browes the various categories and adds the interesting items to his/her Cart and before confirming this request the system shall check the stock if these items are available for now or not. If it's available, then calculate the total amount price and if there is a sale for some items the system must apply it. The system also should calculate the estimated time to deliver these items to this customer/user. System shall provide option to the customer/user if he/she like to cancel the order or some items from the order within some period. Finally, the system should provid option for the customer/user to leave a feedback about some product.
- Functions to deliver:
  - **Admin/System**
    - Add_New_Category
    - Edit_Category
    - Delete_Category
    - Add_New_Items
    - Check_Items_In_Stock
    - Add_Sale_for_items
    - Calculate_Total_Reciept
    - Add_New_User
    - Delete_User
    - Check_Credit_Card
    - Show_all_orders_in_period_time
  - **User/Customer**
    - Add_Items_to_Cart
    - Cancel_Order
    - Cancel_Items
    - Update_Personal_Info
    - Add_Feedback_To_Items

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[Bonus]

- Graph representing statistics about the consuming items within some period of time.
- Use any type of DB(Files, Oracle,…..) that java can support it to manage the data of all previous required functionalities.

22. Tasks & Meetings Organizer

Description

- Each person in his daily life has some tasks to be done, meetings to attend at work and different events. So, one need to schedule and organize those events. We need to automate this process, by creating java application.
- The application enables browsing and retrieving various events in different fields then send a notification for each user who is interested in this field, and if the user accepts to attend this event; it should show this.
- This application should have the following features;
  - Each user shall have an account contains his/her data (including the interesting fields).
  - The admin can show all users that will attend event in the same time.
  - The user can enter either a task or an event, update or delete.
  - For the tasks; each task has a description, start date, end date and the reminder time.
  - For the events; each event has a description, start date, end date, place, start time and reminder time.
  - The application must sort the tasks and the events based on the start date.
  - The application should refuse to add an event that intersects with another event for the same user.

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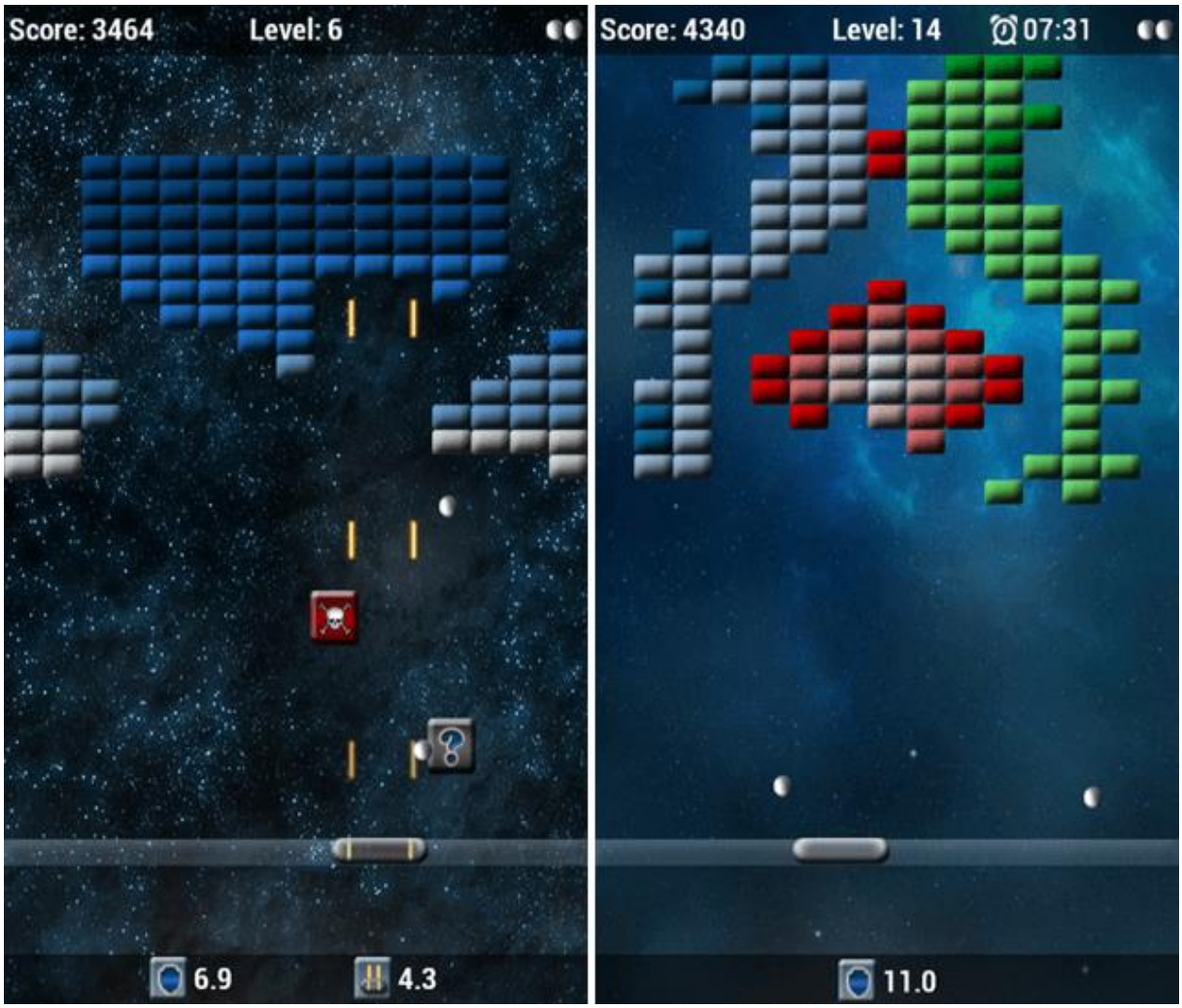
[Bonus]

- Use any type of DB(Files, Oracle,.....) that java can support it to manage the data of all previous required functionalities.

23. Classic Arkanoid Game

Description:

- ***Arkanoid*** is an arcade game expanded upon Atari's *Breakout* games(early ball and paddle video games) of the 1970s.



- The Game is based on a random Pattern of Bricks settled together.
- The player controls the "Vaus", a space vessel that acts as the game's "paddle" which prevents a ball from falling from the playing field, attempting to bounce it against a number of bricks.
- The ball striking a brick causes the brick to disappear.
- When all the bricks are gone, the player goes to the next level, where another pattern of bricks appears.

- Users of the Game:
  - Player: Characterized by Name, Score, High Score.

- The Game deals with:
  - A Paddle: That is characterized by a Colour, length, speed, Power-ups available,life points.
  - A ball: That is characterized by Colour,speed.
  - Bricks: Characterized by Colour,collision state,hit counter,Certain bricks, when destroyed, release a power-up —(Gift/surprise) in the form of a falling capsule.
  - Power-ups: Characterized by effect code/ID,duration,retrieval state.
  - Laser Cannon: a weapon Characterized by ID,laser beam intensity(number of life points reduction),range,duration.
  - Shoot-Gun: a weapon characterized by ID, intensity,number of pistols available,duration.
  - An enemy: Characterized by speed,life points,weapon ID.
  - A board: The container of the bricks,Paddle ,ball,enemy, Player's Score and High Score.

- Functional Requirements:
  - Some bricks have to be hit multiple times before destruction.
  - The player's Paddle has to "catch" the Power-up capsule by touching it with the paddle (in this case, termed "Vaus") to retrieve the power-up and acquire its effects.
  - During game-play, pills/capsules fall from destroyed bricks Called Power-ups. When collected, these pills have various effects on the Paddle/Vaus.
  - Among the many Effects the power-ups provided : An increased paddle size, multiple balls, a "sticky" ball (which would stick to the paddle and could be released when the player chose) and even a laser cannon attachment that allowed the player's paddle to shoot the bricks. As illustrated in the Table:

Pill	Description
S - Slow	Slows down the energy ball.
L - Laser	Enables the vaus to fire laser beams.
C - Catch	Catches the energy ball and shoots it when you want it.
B - Break	Allow player to move to next playfield.
E - Expand	Expands the vaus.
P - Player	Gains an additional vaus.
D - Disrupt	Splits the energy ball into three particles.

- Generate different levels of random bricks distribution in the game board.
- In the last level you will face an enemy that needs 25 hits to be destroyed.
- The enemy can have a weapon to hit your paddle and moves in the board.

❖ Use File System to aid you store and manage the data in the above functions

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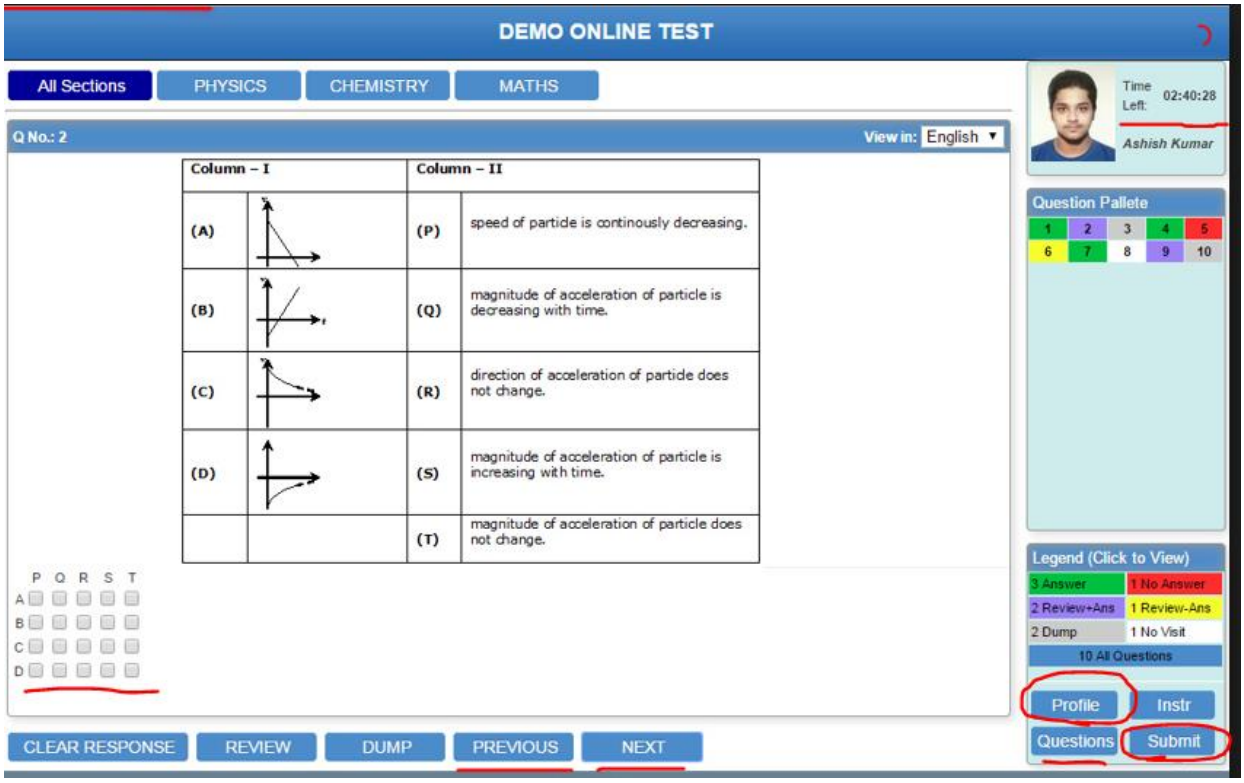
➢ Bonus:

❖ Any innovative non-trivial functionality added.
❖ Any new innovative game Objects or development in the game scenario.

24. Faculty Examination System

Description:

- A system for facilitating the management and the conduction of "Multiple Choice" examination process on a regular basis for Instructors and Students.



- The System reduces the hectic job of evaluating the exam's answers provided by students Manually such that:
  - Responses to exams from all candidate students can be checked and marked automatically.
  - Results are shown immediately after the exams duration reducing the anxiety.
  - Automatic graph generation for evaluating the students grades in any course is a considerable requirement.
  - Questions are ranked automatically after the exam duration according to the most solvable (Experienced >=50% right answers from students) to the Most tough(>50%wrong).

- There are3 types of system users:
  - Instructor: Characterized by a Name, Active Mobile number, Institute email address, Age, list of courses/subject Codes that he teaches.
  - Student: Characterized by a Name, ID, Mobile number, Email address, List of enrolled exam sessions Ids, list of grades.
  - Administrator: Characterized by Username and Password.

- The users of the system deal with:
  - An Examination Session:
    - That is characterized by an ID, list of students and an exam.
  - An Exam:
    - That is characterized by Course/Subject Code, duration time, a timer for handling the responses acceptance, acceptance status, Release Date, Instructor's Name, a list of Questions, a list of announcements, total Grade.
  - A Question:
    - That is characterized by a list of options/choices [a,b,c,d], and the Real correct choice stored, a Grade[quantitative mark],An Evaluation rank .
  - A histogram:
    - That is Characterized by a Particular exam Code, list of Grades, the number of students scoring each grade.
  - An Announcement:
    - That is Characterized by Instructor name, A Hint Message.
  - An evaluation exam Report:
    - Characterized by Exam Code, the histogram of grades distribution, the top 5 most tough questions experienced in the exam.

- Functional Requirements:
  - The Admin can login or logout to the system with his username and password.
  - The Admin can create exam sessions and assign students to them.
  - The instructor and the student must register a profile with their info on the system.
  - The instructor and the student are required to provide a UserName and a Password during the registration process.
  - The instructor and the student can login (after system's validation) or log out from the system using their provided username and password.
  - The instructor has the ability to prepare a new exam (sets all its state attributes) and insert questions to it.
  - The instructor is able to publish an exam to an examination session.
  - The instructor is able to request the system to view an evaluation exam report only after the exam's duration is finished.
  - The Student can view an exam in his assigned session and can solve questions.
  - An exam session can have only 1 valid accepting exam at a time. When the duration is finished the exam's acceptance status is changed to closed.
  - The exam grade is calculated and sent to the student after the duration is finised or the student confirms final submission.

- Use File System to aid you store and manage the data in the above functions.

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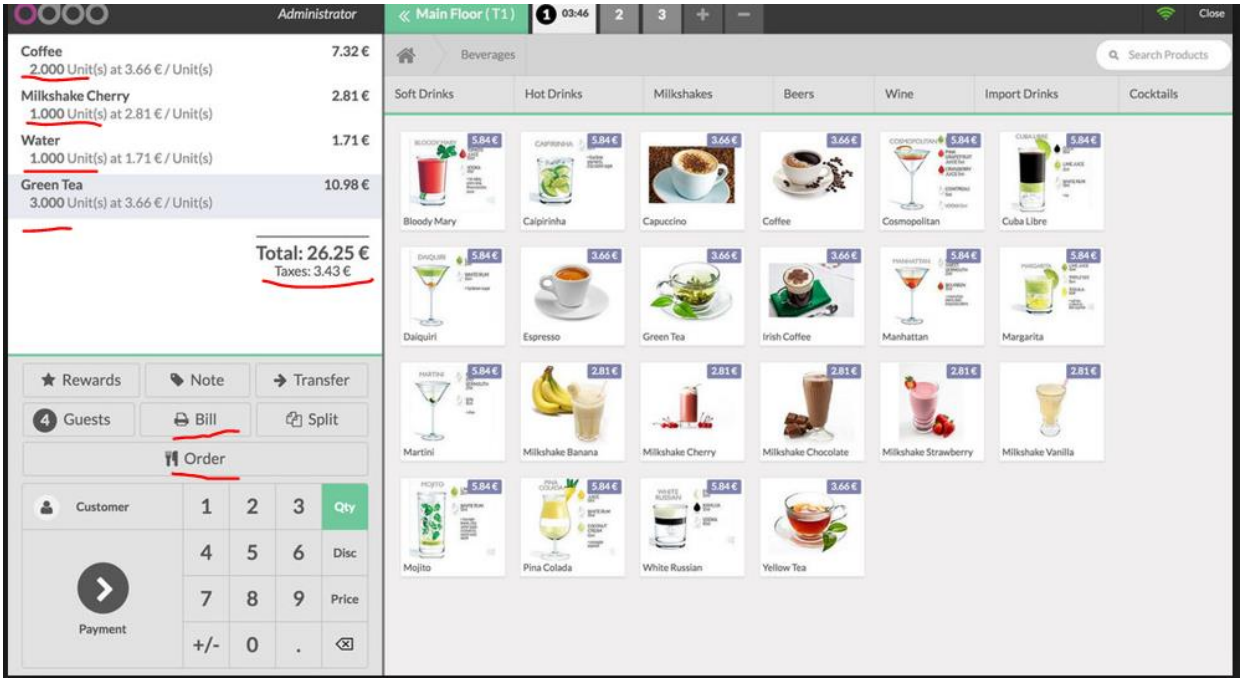
Bonus:

- Any innovative non-trivial functionality added.
- Using JDBC Driver database connection with mySQl/Sql server/Sqlite for managing your data in a database.
- Good User-friendly GUI.

25. Restaurant Management System

➢ Description:

- Restaurant management system helps you capture transactions and manage inventory with accuracy and generally run everyday processes more efficiently,designed for the foodservice industry.



- The System reduces the hectic of managing food orders, delivery employees and tracking inventory items Manually such that:
  - Orders from customers are accepted and bills are calculated automatically.
  - Food categories and ingredient products are managed and tracked automatically.
  - Automatic Management of the delivery boys.
  - The Ability to rank food products by customers is a considerable requirement.
  - Automatic generation of vouchers/promotions to get special offers on food products.

- There are 2 types of system users:
  - Customer: Characterized by an ID, Name, Mobile number, specified address, list of orders.
  - Restaurant Manager: Characterized by a Name, Mobile Number, username Password.

- The users of the system deal with:
  - A Menu Item/food product: That is Characterized by item code/ID, Name, rate/rank, unit price, A photo illustrating the item.
  - An inventory Item: is a Menu item + units sold, quantity available.
  - An inventory: contains inventory items.
  - A Category: That is characterized by a list of Menu Items/Food products, Name.

- A Main Menu: That is Characterized by a list of Categories, Restaurant Name.
- An Order: That is characterized by an ID, list of Menu items/food products, amount of each product, Customer Name, Customer ID, Customer Address Customer Mobile Number, estimated delivery time, associated delivery boy, Received Status, Complain message.
- A Bill: That is characterized by an ID, Date, all Order attributes, delivery charges, total cash amount, Voucher/promotion ID, Voucher's discount percentage, total cash after discount,
- A Voucher/Promotion: That is Characterized by an ID, discount percentage amount, release date, expiration date.
- An Announcement for special offers: That is Characterized by Restaurant Manager Name, a Message, A list of Menu Items/food products.
- Delivery Boy: That is Characterized by ID, Name, Working hours, availability status, list of orders.

❖ Functional Requirements:
  - The Customer must register his info in a profile on the system.
  - The Customer and the Restaurant Manager can login or logout with a username and password.
  - The Restaurant Manager can create A main menu and add menu items/food products to it.
  - The Restaurant Manager can add, delete and view inventory food items of the inventory.
  - The customer or the Restaurant Manager can view the main menu.
  - The customer can rate a food item [1 to 5 Stars].
  - The customer can place an order.
  - A Customer can cancel an order within 10 minutes after it has been issued.
  - The system has the ability to track quantities available in the inventory and products sold from customer's orders.
  - The Restaurant Manager can publish an announcement of special offers in the main menu.
  - The System is able to provide a promotion/voucher for the customer's orders that exceeds 1000 L.E (e.x 20% discount).
  - The Customer Gets A voucher with" 30% discount" from the total order Price when he first creates an account.
  - The Restaurant Manager can manage the employees who deliver the orders to the customers and assign orders to them.
  - Each delivery boy cannot deliver more than 2 orders at a time.
  - The Customer can return the order after receiving it and send a complain to the restaurant about the state/quality of the returned food (not fresh-not warm..etc).

❖ Use File System to aid you store and manage the data in the above functions

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Bonus:

- Any innovative non-trivial functionality added.
- Using JDBC Driver database connection with mySQl/Sql server/Sqlite for managing your data in a database.
- Good User-friendly GUI.