KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
Information and Computer Science Department

ICS-201 Introduction to Computer Science Project

DINER DASH CLONE

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Welcome to ICS 201 Term 162 Project Document =)

Due: Each student is required to submit, in his ICS 201 Lab Blackboard, a zip file containing the eclipse project folder containing all the files to run the game in addition to a standalone JAR application that can be used to run the game directly. You are requested to work on the project as groups of two. The submission deadline will be announced later. The submitted zip file must be in the format:

YourKFUPMID_ProjectGroupNumber.zip (Example: 201300000_Group05.zip)

Notes:

- I will update the document if needed. Keep checking the file from time to time.
- You need to work in pairs of two. I need the names of the teams by the next lab.
- I will take questions about the project in the first 15 mins in all upcoming labs that we have left.
- I will dedicate office hours by appointment for questions. If you have a question about the project, you have to bring your laptop or code with you. I will announce the location later.
- You must use meaningful variable names and proper indentation in your program.
- You must not share code with another project group. Doing so will result in a zero grade for all groups involved.
- The project you submit must be your own work and not copied from other sources. Doing so will result in a zero grade.
- Project demo slots of 20 minutes per group will be announced later. The demonstration day and room will be announced later. All group members are required to attend the project demo together.

Diner Dash Clone Project

1) Introduction

Figure 1- Diner Dash Game

In this project, we are going to build a clone of a well-known game called Diner Dash. The original game was released in 2004 for PC platform then after that it was released for a variety of platforms including mobile phones both Android and IOS in addition to Nintendo DS and PlayStation Portable.

Diner Dash is a strategy video game and time management that was initially developed by American game development studio Gamelab and published by PlayFirst. It is one of the top-selling downloadable games of all-time.

The gameplay of Diner Dash involves seating customers and guiding Flo the waitress around the restaurant to serve customers. If enough money is earned after each level, the player progresses to the next. As the game progresses Flo updates the dilapidated restaurant she begins with and builds three further restaurants, which provide new settings.

Gameplay centers around catering to customers to gather as much money as possible. Flo can be moved around the restaurant to complete tasks. As customers arrive in the restaurant, the player must drag and drop them onto a table where they sit down and read menus. Then the player must guide Flo to the table to take their order, which must be taken to the service hatch. After the chef has prepared the meal, Flo must deliver the food. When the customers are finished eating they must be taken a check, at which point the customers leave a tip and their dishes on the table, departing the restaurant. The dishes must be cleared by Flo before the next set of customers can use the table. Each successful action earns the player points, performing the same action multiple times in a row earns the player a chain bonus, which is broken once a different action is performed.

Customers have a series of hearts over their heads that indicate their mood. The longer the customer is forced to wait, the more hearts he or she loses. Each type of customer has different degrees of patience and tipping habits. Flo can perform various actions, such as talking to customers or serving them drinks, to revive these

hearts. When customers lose all their hearts, they leave the restaurant, costing the player points. The goal of a level is to earn a certain number of points. There are also expert point totals for advanced players to achieve.

The game has two modes: Career mode, which follows the story of Flo, and Endless Shift, a survival mode in which the player must last as long as possible in a single level.

If you are interested more in the original game you can always check gameplay videos that are available on YouTube.

In this project, we are going to focus on a small subset of the core game mechanics that fulfill the purpose of the project yet make the developed game playable and enjoyable.

2) Project Details

The application that we are going to build will consist of three main screens: Main Menu, Leaderboard and game. We will talk about each screen in details in the following sections.

The Main Menu

In the main menu, the player should find the name of the game in addition to three buttons. Regarding the name of the game, I will leave this to your creativity and imagination. Regarding the buttons, the first one should lead the player to play the game. The second one will take him to the leaderboard. While the third will be to exit the game, and close the application. The main menu should look somehow similar to Fig 2.

Note: Throughout the document I will use sketches and figures to refer to the application screens not screenshots from the real clone game. However, you have to maintain the same feel and look of the provided sketches in your application.

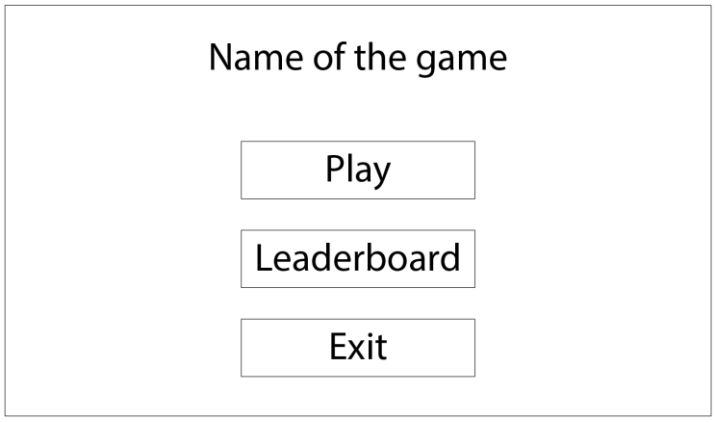


Figure 2 - Main Menu

Notice that the main menu does not have the top bar (Fig 3) that usually contains the name of the application and the sizing and closing buttons.

Figure 3 – Top bar

Leaderboard

In this screen, we are going to display the names of the players who played the game previously and their scores. We should allow the player to sort the records based on the names or the scores in both ascending or descending order. The leaderboard screen should look like Fig 4.

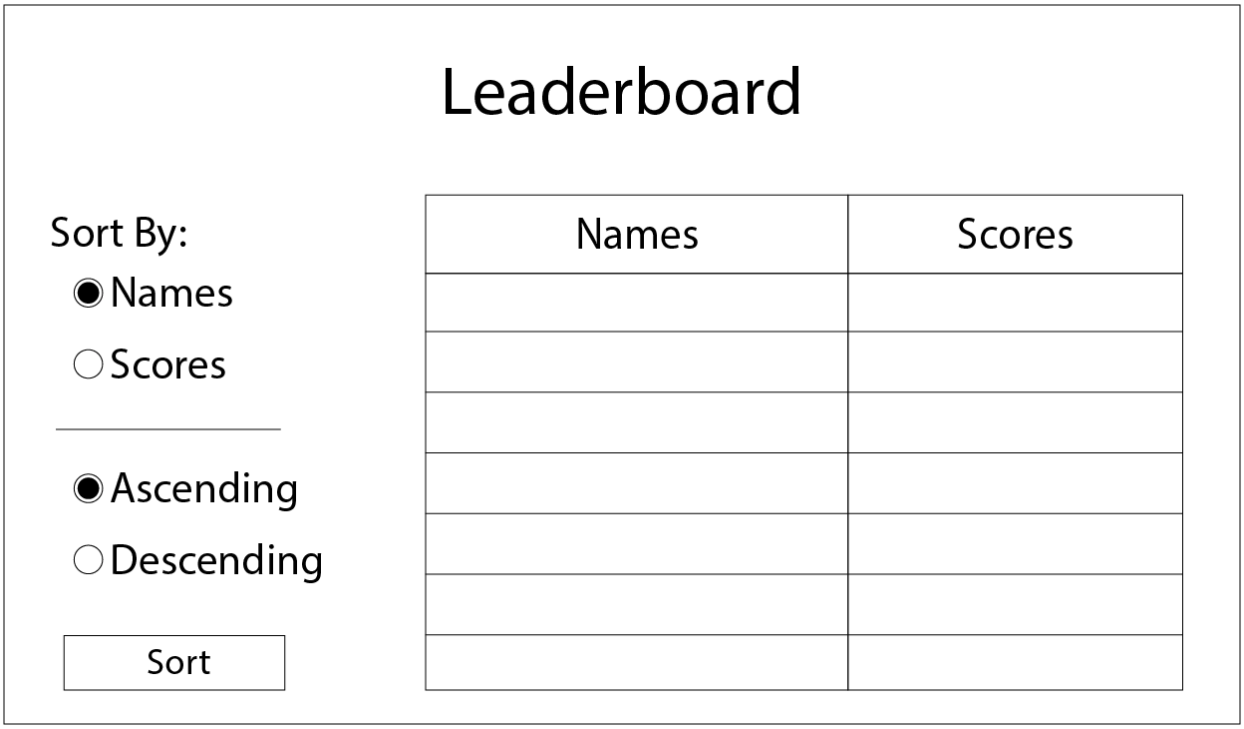


Figure 4 - Leaderboard Screen

The player can choose the options of sorting using radio buttons. Once he selects his options he can click on Sort button to reorder and sort the records that appear in the table according to the selected options.

Regarding the records of names and scores, I will leave the option for you to store them the way you like. You can try storing them in text files for simplicity. However, I would recommend that you try to encrypt the data and store it in files with new unique extension that you create and once you decide to read the data you decrypt it within the application and use it as usual. This will prevent the player from altering their scores from the text files.

Game Screen

In this section, we are going to talk about the layout of the game screen and how it should appear only. The details of the game will be discussed later in the document (I know that you are excited but still you have to wait).

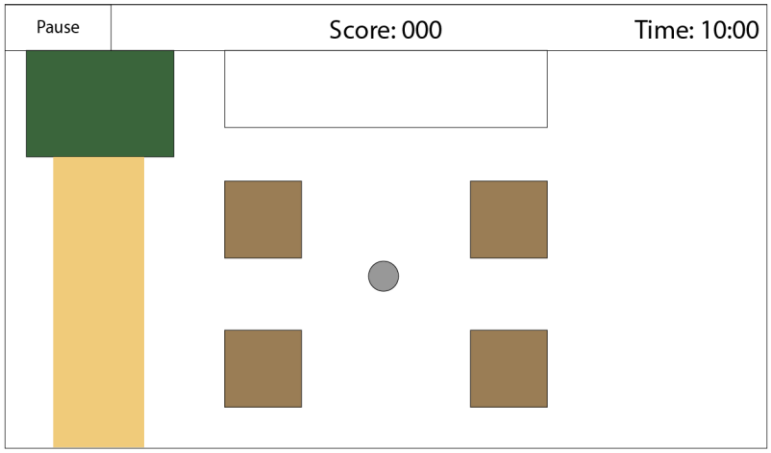


Figure 5 - Gameplay Screen

The previous figure shows what the player would be expecting to see when he clicks on the play button in the main menu. As you can see the screen can be divided into two main panels: The HUD and the game itself.

HUD is an acronym of Head-Up Display. In video gaming, the HUD or Status Bar is the method by which information is visually relayed to the player as part of a game's user interface.

Here in our screen we can see three main components in the HUD. The first one is the Pause button. By clicking on this button, the game should stop and a pop-up window will appear to the user to ask him whether he would like to continue playing or go back to the main menu (Fig 6). The second item in the HUD is the score which is simply a text that shows the score of the player during the game. The third item that appears in the right most corner is the timer. This timer shows how many minutes and seconds left before the game ends and again it is a simple text.

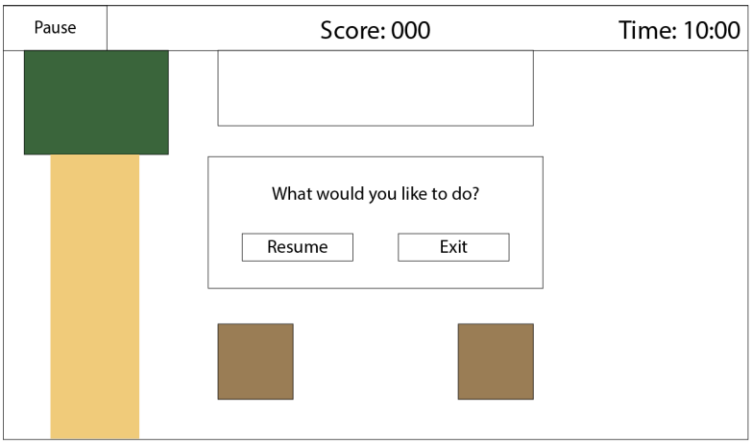


Figure 6 - Pop-Up Window

The second part of the game screen is the game panel. This part of the screen is where the player will be playing.

The game panel shows several components. The first component is the Chef table which appears as a white rectangle in the top of the panel. The second component is the reception which is the green rectangle that appears in the top left corner where the light brown one is the carpet where the customers will be standing and waiting their turn. Then there are the customer tables as brown squares that appear in the middle. Furthermore, there is the waitress which appears as a grey circle in the middle of the panel.

The last two components that do not appear in Fig 5 are the customers and the meals. Customers have two formations which means they appear on the screen in two ways. The first one is when they are waiting their turn and we see them as two circles close to each other. However, when they are picked to set on one of the tables we will see them separated and setting on opposite sides of the table. On the other hand, meals are simply small squares that appear on the Chef table whenever they are ready. This can be clearer by referring to figure 7.

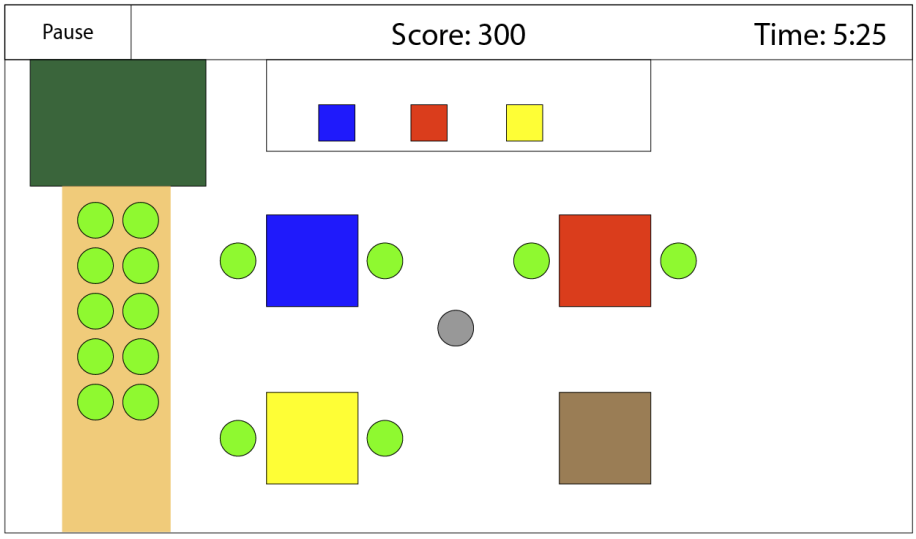


Figure 7 - Customers & Meals

You can notice in figure 7 that the color of the tables has changed. We are going to talk about that in the next section.

Gameplay and Game Rules

Finally, we reach to the meat. All the previous sections are considered to be easy compared to this one. However, do not be fooled by the amount of details here. The implementation is way much easier than you think. So, let's dig into it =).

As you have read earlier the main goal of the game is to serve the customer in your restaurant and in order to do that you have to control the waitress to do a sequence of actions within a time frame.

Now let's talk about the game elements one by one in more details.

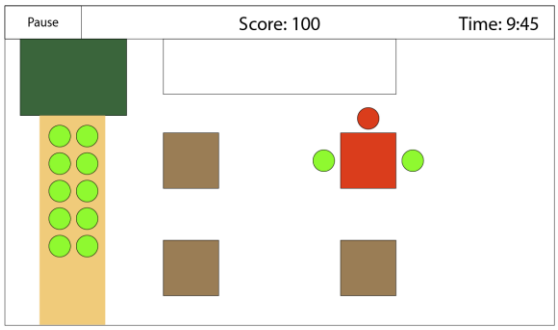
The Timer

This game element controls the time given to the player per game. The goal of the game is to serve as many customers as possible within the time limit. The job of the timer is to count down from 10 minutes until it reaches 0. Once the time is over, the game should stop and a pop-up window should show the score to the player and ask him for his name. The pop-up window should also contain a button Submit that will take the name of the player and his score to be saved in the records and return him to the main menu.

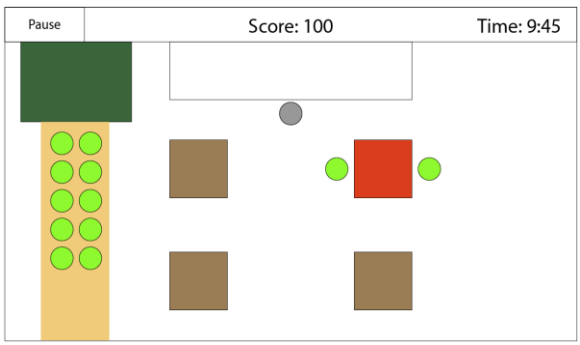
The waitress

The waitress is considered one of the main elements in the game. The main tasks of the waitress can be summarized as the following:

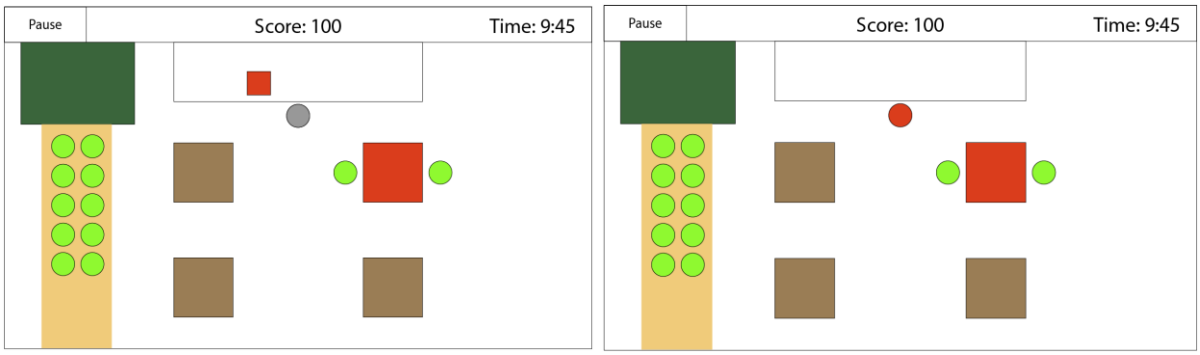
- Picking orders from the customers sitting on tables: once you pick an order the waitress character (the gray circle) will change its color to match the order color (will talk about orders later) and at the same time the color of the table will match that color too. The figure below shows the waitress picking an order from the top right table and that turned the color of her and the table to be red.



- Giving the order to the Chef: after picking an order, the color of the waitress will remain the same until she gives the order to the Chef. Once she does that, her color will return to grey.



- Delivering the meal to the customers: Once the meal is ready, the waitress should pick the meal and give it to the right customers. The meals will appear as colored squares that match the orders color. Therefore, when the waitress picks a meal, her color should change again to match the color of the meal. This will help the player to know where to take the meal since the right table will be colored with the same color.



All the previous tasks should be taken by the player and in order to do that the player must first select the waitress by clicking on it using the mouse curser. After that he must click on the location where the action will be performed, for example:

  - To pick an order or deliver a meal: after selecting the waitress, the player should click on the table to take the order from it or deliver a meal to it.
  - To give the Chef an order: again, after selecting the waitress the player should simply click on the Chef table.
  - To pick a meal from the Chef: as usual, after selecting the waitress the player should simply click on the meal itself.

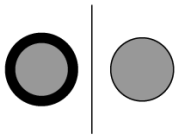


Figure 8 - Selected vs Unselected

The customers

The customers come always in pairs. That means two customers at a time. The customers should appear in the queue randomly. This means the interval between one pair of customers and another is random. When the carpet is full, your restaurant should not accept any more customers.

To give the pair of customers a table, the player must select them (selecting one customer in the pair should select both) then choose an empty table. This means selecting a table with customers sitting on should not move the selected customers. Once an empty table is picked, the selected customers should move to the table and sit across each other as shown in previous figures.

After that the customers will decide on an order. Once an order is chosen, the table of the customers should change its color to match the order. Then they will wait for their meal to be ready. Once the waitress brings their meal they will eat it and then once they finish they will pay the bill and leave.

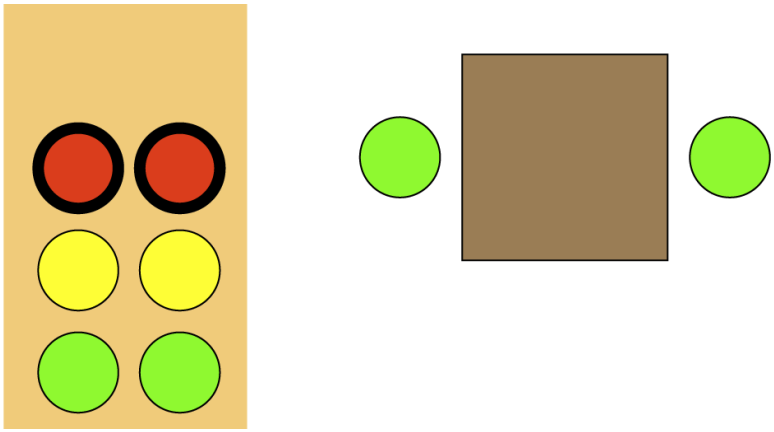
To make the game more exciting and similar to the original Diner Dash we need to add an extra game mechanic to the customers which is mini timers.

Let's elaborate more on this. Once a pair of customers enters the restaurant and stands in the queue, they will wait for 40 seconds before leaving the restaurant angry. If they got selected and been seated on a table the timer will stop. Now, another timer will start to count for 5 seconds which is the amount of time they will take to select their order (this is done by the program not the player). Once the order is ready, a new timer for 40 seconds will start counting down waiting for the waitress to come and pick their order or again they will leave angry. Once their order is picked, they will wait for 40 seconds to get their meal or they will leave angry. Once they get their meal, a new timer will count down for 10 seconds which is the time they will take to finish their meal and leave (again this will be done by the program not the player).

As you have noticed, the 40 seconds' timers are the time windows for the player to take actions or the customers will leave the restaurant angry. To show the player the amount of time left before losing the customers, we are going to change the color of the customers as the following:

- At the beginning, the customers should be green.
- If 25 seconds left, the customers should be colored yellow.
- If 10 seconds left, the customers should be colored red.

Each time a timer starts, the color of the related customers should be reset to green.



If the customers managed to finish their meal, the player should get 150 points. However, if they leave the restaurant angry, the player will lose 100 points.

Orders, meals & tables

The colors of meals and tables are governed by the color of the order. To make things simple, since we have four tables, then we are going to have 4 orders maximum at the same time. Therefore, we can use a pool of 4 colors to pick from randomly for each order. A pool of colors means, if a color is picked you cannot pick it again until you return it. In our case, if a color is picked for an order, this color should not be returned to the pool unless:

- The customers finished their meal and left
- Or the customers ordered a meal but the player took more than 40 seconds to give it to them so they decided to leave

In both cases, the color should return to the pool.

The time it takes for the Chef to finish a meal is 10 seconds. Once the meal is ready, it will appear as a square as discussed earlier. If the customers left without eating, the meal should disappear.

Scoring

As you have read earlier, the score in the game is calculated based on the customers. If they finish their meal the layer gets 150 points. However, if they leave the restaurant angry the player loses 100 points.

Once the game finishes and the player enters his name, the program should search the saved records for similar name. If a match is found, the program shall pick the higher score and save it to that player.

Conclusion

That is it basically =)

3) General Tips

- I advise you to start as soon as possible.
- Use all the knowledge that you know specially Inheritance, Polymorphism, Interfaces and Inner classes. It will make things way much easier.
- Moving the customers and waitress is done without any animations. No need to over complicate things. You can simply remove it from one place and draw it in a new one immediately.
- If you are wondering how to select drawn shapes like oval or rect, think about the following:
    - Can you get the X and Y coordinates of the mouse when you click?

    - Do you know the location of the shapes on the screen?
    - Can you relate and link class objects with drawn shapes?
    - How to show that this shape has been selected? (Hint: thick stroke)
- I suggest that you make the game window not resizable and fix it is width and height to be 1240x720 which is a good resolution for most screens.
- You can build each screen in the game as a separate JFrame.
- If you face a problem, think about a solution or search for one. If you cannot find one, then ask your partner. If you both give up, you can always ask me.