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## Computer Organization & Assembly Language

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BS (DS) Fall 2025

### Final Project



# Instructions

- This project is **individual** based.
- User Interface is important in this project. Try to develop an attractive user interface.
- Use of extra features in the project is encouraged.
- Use good programming practices (well commented and indented code, meaningful variable names, readable code etc.).
- You are required to submit a zip file containing your complete code (.asm) file and a report (word document .docx) for your project. The report should contain all your project details, explanation, UI screenshots, manual, video link etc. The format for your files is as follow: RollNo\_Section\_Name\_CoalProject.zip
  - *i241234\_AI-B\_ABC\_CoalProject.asm*
  - *i241234\_AI-B\_ABC\_CoalProject.docx*
  - *i241234\_AI-B\_ABC\_CoalProject.zip*
- You need to submit a video of your full game (upload the video to Google Drive and paste the link in your report).
- Evaluation Criteria will be shared with you afterwards.
- **Project Deadline: Saturday, 29th November, 2025.**
- **You must have an understanding of every line of code you write in the project. During the demo, you will be required to explain your code and write any part of it if asked. Failure to do so will result in zero marks for the project or an F grade in the course. Therefore, do the project yourself to ensure fair evaluation.**
- **A submission that is 1 day late will incur a 15% deduction.**
- **A submission that is 2 days late will incur a 35% deduction.**
- **No evaluation will be conducted after 2 days from the deadline.**
- **Copy/cheating and code copy from any AI Source will be awarded an “F” grade in the course**

## **RUSH HOUR GAME**

Rush Hour is a game for one player, in which the player takes up the role of a taxi driver who must collect money by dropping passengers to their destinations.

In this project, you have to make the Rush Hour game of 1 player with the following features:

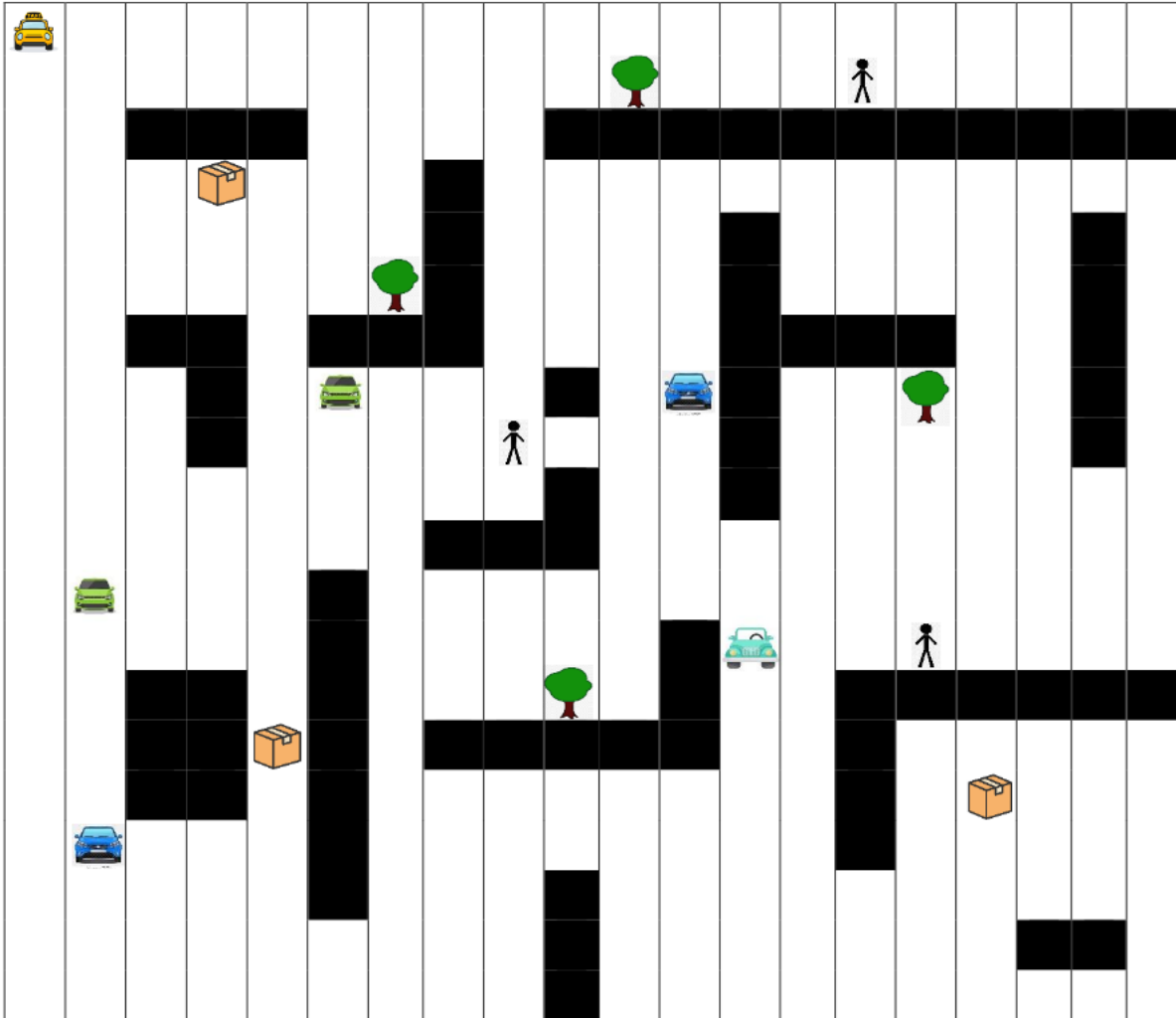
### **Game Basics**

1. When the player starts the game, they will be shown an initial menu, where the user will have an option to Start a New Game, Continue the Game, Change Difficulty Level, View the Leader Board, Read the Instructions menu.
2. Your game will feature multiple screens in which the player can move back and forth.
3. The leaderboard of the game will display top 10 scores along with player names). The high-scores and player names should be read from the file (named highscores.txt) on the hard-disk and stored in the arrays of size 10. If the score of the current game makes to the list of high-scores, the lowest score is removed from the array and the new contents of the array overwrite the file. If the game is being played for the first time the leaderboard will be empty.
4. The game can be played using one of the following, a yellow taxi and a red taxi. An option will be shown to the user on screen to either assigning the taxi color randomly or users can select the color themselves.
5. Once the player has selected a taxi he/she will enter their name.
6. The game will also feature multiple game modes including Career Mode, Time Mode, Endless Mode.
7. The game will also feature immersive audio sounds that will play upon Click, Pick Up Passenger, Drop a Passenger, Crash, End Game etc.
8. The player will also have an option to Pause the game using the "P" Key.

### **The Board**

1. Draw a 20x20 Board on the screen. A sample board is attached below but you are free to be more creative and make as beautiful board as possible. Projects will be evaluated relatively, so you can earn more marks by designing more attractive board.
2. The board has two areas, roads (shown in white) and buildings (shown in black), cars can be driven anywhere on the roads.
3. The board consists of the player's taxi and other cars, obstacles and passengers.
4. At the start of the game, the player's taxi will be at the top left corner of the board as shown in the picture above. Other cars, obstacles and passengers will be randomly spread out on the board.

- The board shall always have at least 3 and at most 5 passengers waiting to be picked up. The passengers can be present at any location on the board except the position where other cars or obstacles are present.



## Game play

1. The player's taxi can move in all four directions (up, down, right and left using the four arrow keys **up**, **down**, **right**, **left**).
2. The taxi has to avoid obstacles and other cars and get to the people waiting for a taxi. Once the taxi is next to a person, the player will press the **Spacebar** to pick the passenger.

### Passenger's Desired Destination

1. Each passenger would have a desired destination on the board, that would be highlighted in GREEN once the taxi picks up the passenger. The taxi has to get the passenger to the desired location as fast as possible.

2. The desired destinations of the passenger will be a randomly generated position on the board. The destination cannot be a place occupied by an obstacle.
3. The desired destination of the passenger cannot be the same as the pickup location. To drop a passenger the player will press the **Spacebar** after getting to the location.
4. Once the taxi has picked up a passenger, they cannot drop them anywhere except for their desired destination.
5. Every time the taxi picks up a passenger and drops them to their desired location the player gets 10 points.
6. The NPC cars that are present in the map will move in a fixed path, a straight line, either up, down or left, right, based on their location in the map.
7. There are also bonus items on the map that the driver can collect to get **additional 10 points**.

## Negative Points

However, there are some negative points as well:

If the taxi hits a person **-5 points**

If the taxi hits other obstacles the points deducted depend on the type of taxi:

- Red Taxi: Hits an obstacle (tree or box) **-2 points**
- Red Taxi: Hits another car **-3 points**
- Yellow Taxi: Hits an obstacle (tree or box) **-4 points**
- Yellow Taxi: Hits another car **-2 points**

## Other features

1. Cars other than the taxi cannot be red or yellow.
2. All other cars on the board are also moving, they can move up, down, right and left. The other cars cannot stop anywhere during the game.
3. Each time the taxi drops two passengers successfully at their desired destination the speed of the cars on the board will increase.
4. The two taxis can move at different speeds; the yellow taxi is faster than the red taxi.

## Graphics

As a start you can create a stick figure to represent passengers and a rectangle with two circles to represent a car. But as you progress the visuals can be improved. The better the visual the more chance to score more marks.

**Bonus Features:**

1. Additional marks will be given based on the visuals and graphics of your game.
2. A new board is generated every time a new game is started, however every corner in the board must be reachable. 35% of the board should be buildings and the remaining 65% should be roads.
3. Continue mode option, player can leave/save the game, the current state of the game gets save in a file and can be loaded again to continue the game from where the player left the game.