# Old Dominion University

## Department of Computer Science

## Semester Project

## Arena Management System

## CS250


Dr. A Elmesalami

**Introduction:**

Most people have been to an area to watch a sports team or event. The operation requires a high level of accuracy when scheduling events and managing sales. This project is aimed to automate all arena activities including ticket sales, food and drink sales, parking, staff, and other financial aspects. This project will expose Computer Science students to a real world problem that will prepare them to be good problem solvers in the industry of software development.

Consider that you are tasked with building an Arena Management System. The management system allows the owner to schedule events, manage staff, manage finances, manage parking, and sell tickets, food, drinks, and other apparel.

**Description: Project Details:**

**ADT's**

1. Tickets: This ADT contains all information related to the management of ticket sales. It has the following data members. (There should be 50 sections with 10 seats per section in this arena. Each seat should cost 45$)
    a. Section number
    b. Seat number
    c. Price
    d. Date
    e. Time
    f. Sold (Boolean)
    g. id
2. Schedule: This ADT contains all information related to the scheduling of events. It has the following data members.
    a. Date
    b. Time
    c. Event name
3. Parking: This ADT contains all information related to the management of parking. It has the following data members.
    a. Section number
    b. Parking space number
    c. Price
    d. Available (Boolean)

4. Staff: This ADT contains all information related to the management of staff. It has the following data members.
    a. Id
    b. Name
    c. Job
    d. Salary
5. Bank Account: This ADT contains all information related to the management of finances. It has the following data members.
    a. Total Sales
    b. Cash on hand
    c. Debt
6. Concession Stand: This ADT contains all information related to the sale of food, drinks, and merchandise. It has the following data members.
    a. Hot dogs (3$)
    b. Peanuts (1$)
    c. Burgers (5$)
    d. Soft drinks (1.50$)
    e. Beer (8$)
    f. Jersey (100$)

    Note: Each of the items sold at the Concession Stand needs to have its own price and inventory. It is up to the student to choose how to do this.

**Required ADT's:**

1. Tickets
2. Schedule
3. Parking
4. Staff
5. Bank Account
6. Concession Stand

    Feel free to make more if you think you need to; you must justify why you need more ADT's. This is the minimum amount of ADT's allowed in this project.

**Functional Requirements:**

**Program Flow:**

The operator of this program will be the owner of the arena, with little knowledge about computers. Moving forward, this owner who operates the program is called a "user".

After launching the program, the main menu is displayed on the screen for the user, something like this:

Welcome to Arena Management System. Please choose an action:

Main Menu:

1. Manage Tickets
2. Manage Schedule
3. Manage Parking
4. Manage Staff
5. Manage Bank Account
6. Manage Concession Stand

After selecting 1 or 2 or …. or 6, the program prints a different sub-menu for each menu. For Example:

Option 1:

1. Show all ticket's info
2. Show all available tickets
3. Show all unavailable tickers
4. Sell/Refund ticket
5. Update ticket info
6. Search for ticket by date
7. Main menu: takes the user back to the main menu

Note: You can assume that all input from the user will not have any errors in it.

**User Stories:**

Creating a list of user stories is the best way to break up a project into multiple smaller projects/functions that are easier to implement.

1. As a user, I want to be able to show all ticket's info
2. As a user, I want to be able to show all available tickets
3. As a user, I want to be able to show all unavailable tickets
4. As a user, I want to be able to sell a ticket
5. As a user, I want to be able to refund a ticket
6. As a user, I want to be able to be able to refund a ticket by section (adjust bank account accordingly)

7. As a user, I want to be able to print a ticket by date
8. As a user, I want to be able to create a new event and have tickets generated automatically
9. As a user, I want to be able to print all event's information
10. As a user, I want to be able to adjust an event's information (also adjust tickets accordingly)
11. As a user, I want to be able to cancel an event, refund all ticket sales, and adjust the bank account accordingly
12. As a user, I want to be able to print all events on a certain date
13. As a user, I want to be able to print all parking information
14. As a user, I want to be able to print the info of a certain parking section
15. As a user, I want to be able to, given a number by the user, print all parking section's that have at least that many open parking spots
16. As a user, I want to be able to adjust the of parking spot's availability
17. As a user, I want my parking lot to have 20 sections of 30 parking spots costing 10$ each
18. As a user, I want to be able to adjust the bank account according to the number of parking spots sold
19. As a user, I want to be able to adjust staff info
20. As a user, I want to be able to print all staff
21. As a user, I want to be able to print staff given an id number
22. As a user, I want to be able to print staff of a certain job type
23. As a user, I want to be able to hire new staff
24. As a user, I want to be able to fire existing staff
25. As a user, I want to be able to print bank account information
26. As a user, I want to be able to adjust bank account information
27. As a user, I want to be able to calculate a given months ticket sales
28. As a user, I want to be able to pay off a given amount (by user) of debt directly from cash on hand
29. As a user, I want to be able to print out how long it will take for the arena to pay off its debt (average three latest months of sales to calculate)
30. As a user, I want to be able to print total lifetime sales amount from the concession stand
31. As a user, I want to be able to order new inventory and adjust the bank account accordingly (the cost of ordering inventory is 50% of the sale price)
32. As a user, I want to be able to sell items from the concession stand (adjusting bank account accordingly)
33. As a user, I want to be able to know when an item is sold out.
34. As a user, I want to be able to print all concession stand info

**Note:** If any of the user stories are vague, it is up to the student to decide how to implement the functionality.

**Input files:**

For each ADT, an input file will be given to the student. While certain input files such as tickets will have a large amount of information to read into data structure, other input files such as bank account, will have very little information.

## Grading

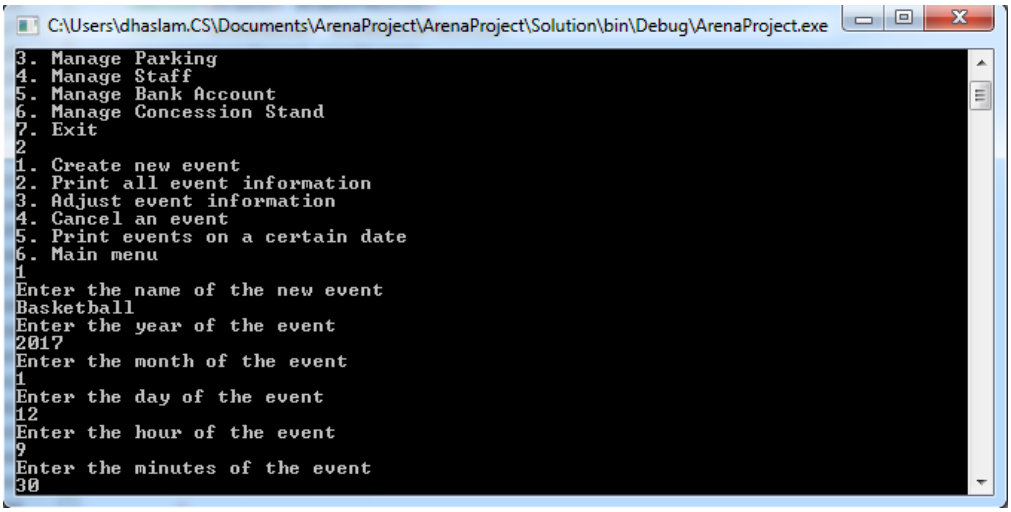
- Compilation 15%
- **Correct Output**
  - Menu Functions Correctly 5%
  - Manage Tickets Correctly 5%
  - Manage Staff Correctly 5%
  - Manage Parking Correctly 5%
  - Manage Schedule Correctly 10%
  - Manage Bank Account Correctly 10%
- Appropriate ADT's 30%
- Using Member Functions 10%
- Comments and Indentation 5%

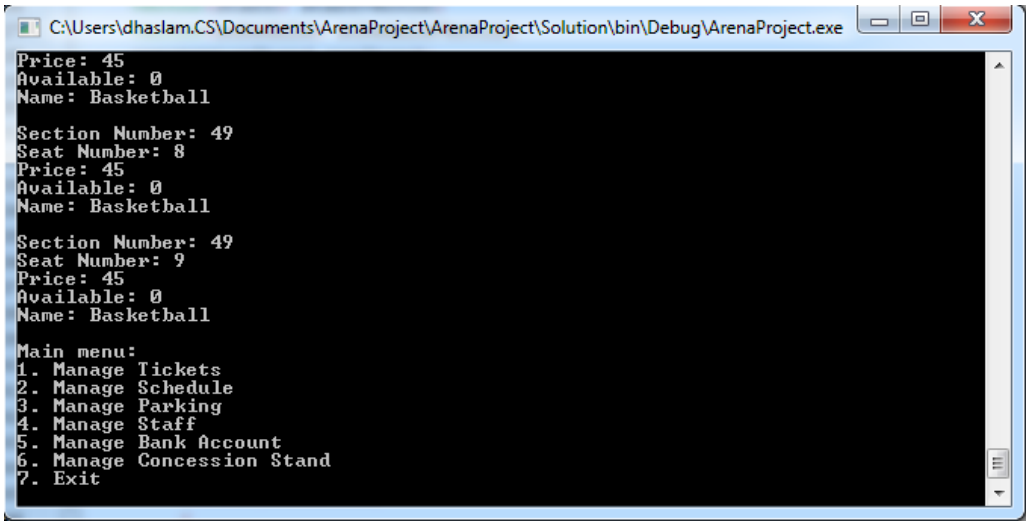
## Penalties

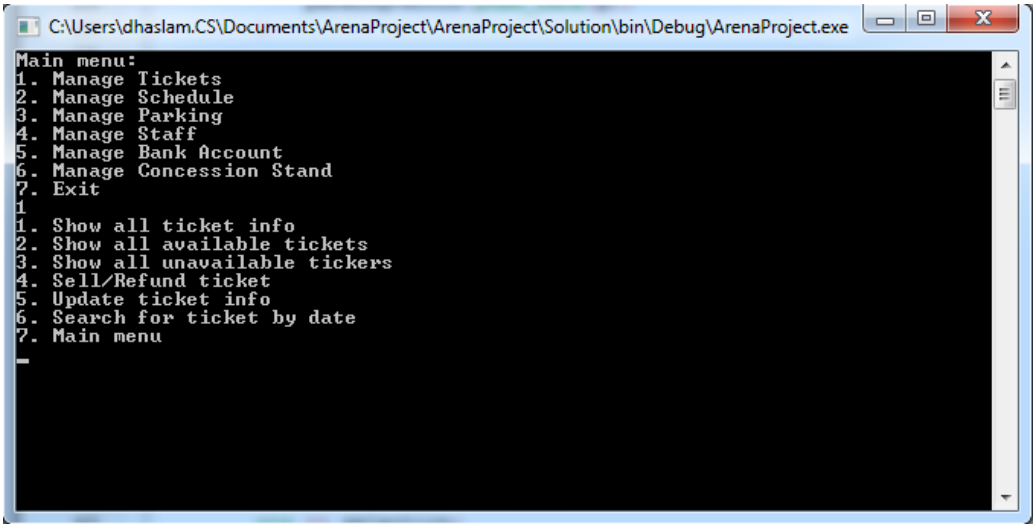
- Including .cpp files in another .cpp file -20%

These penalties will be deducted from your total points obtained, i.e. if a student obtains 95 out of 100 and that student included .cpp files in another .cpp file, then his/her grade will be 75 out of 100.

**Example of output:**


C:\Users\dhaslam.CS\Documents\ArenaProject\ArenaProject\Solution\bin\Debug\ArenaProject.exe
3. Manage Parking
4. Manage Staff
5. Manage Bank Account
6. Manage Concession Stand
7. Exit
2
1. Create new event
2. Print all event information
3. Adjust event information
4. Cancel an event
5. Print events on a certain date
6. Main menu
1
Enter the name of the new event
Basketball
Enter the year of the event
2017
Enter the month of the event
1
Enter the day of the event
12
Enter the hour of the event
9
Enter the minutes of the event
30


C:\Users\dhaslam.CS\Documents\ArenaProject\ArenaProject\Solution\bin\Debug\ArenaProject.exe
Price: 45
Available: 0
Name: Basketball
Section Number: 49
Seat Number: 8
Price: 45
Available: 0
Name: Basketball
Section Number: 49
Seat Number: 9
Price: 45
Available: 0
Name: Basketball
Main menu:
1. Manage Tickets
2. Manage Schedule
3. Manage Parking
4. Manage Staff
5. Manage Bank Account
6. Manage Concession Stand
7. Exit


C:\Users\dhaslam.CS\Documents\ArenaProject\ArenaProject\Solution\bin\Debug\ArenaProject.exe
Main menu:
1. Manage Tickets
2. Manage Schedule
3. Manage Parking
4. Manage Staff
5. Manage Bank Account
6. Manage Concession Stand
7. Exit
1
1. Show all ticket info
2. Show all available tickets
3. Show all unavailable tickers
4. Sell/Refund ticket
5. Update ticket info
6. Search for ticket by date
7. Main menu