

Project Report

SalonPro – Streamlining Beauty Services

Introduction (Aim or Motivation): The Salon Management System project has emerged as a strategic response to the inherent challenges faced by the salon industry. It aims to revolutionize salon operations by addressing critical issues related to appointment scheduling, service selection, staff management, and membership discounts. The primary objective is to create a user-friendly solution that empowers customers to seamlessly choose services, staff, and timings, apply discounts, and manage their carts. Simultaneously, the system aims to enhance administrative capabilities, providing efficient tools for staff, salary, service, appointment, and membership management. The ultimate goal is to deliver a more organized and efficient salon experience for both customers and staff.

Background (Project Selection): The salon management system project was carefully chosen to fulfill the requirement of incorporating all concepts taught in the C language curriculum, presenting a unique opportunity to showcase our proficiency in C programming. In aligning with this academic objective, we strategically selected a project that not only encapsulates the breadth of C language topics but also addresses practical challenges within the salon industry. The extensive nature of the system allowed us to seamlessly integrate dynamic memory allocation, file handling intricacies, modular coding practices, and more. By undertaking this project, we aimed not only to meet academic criteria but also to contribute meaningfully to the salon sector, thereby highlighting the dual significance of our efforts.

Project Specification: *Project Overview:* SalonPro is a holistic software solution that caters to both customers and administrators. It facilitates effective management of appointments, services, staff, and memberships.

Customer Modules:

1. **Service Selection:** Customers can effortlessly browse and select salon services, including haircuts, manicures, facials, etc.
2. **Staff Selection:** The system allows customers to choose specific staff members for their selected services.
3. **Appointment Booking:** Customers have the flexibility to schedule appointments at their preferred times.
4. **Cart Management:** The system enables customers to view and edit their selected services before confirming appointments.
5. **Membership:** Customers can apply for membership cards to access exclusive discounts.

Admin Modules:

1. **Staff Management:** Administrators can seamlessly add, edit, or remove staff members, specifying their skills and availability.
2. **Salary Management:** The system supports the effective management of staff salaries, allowing them to edit the salaries of specific staff members.
3. **Service Management:** Administrators have the capability to add or modify salon services and their corresponding prices.
4. **Appointment Management:** An intuitive dashboard empowers administrators to efficiently view and manage customer appointments.
5. **Membership Management:** This module handles membership applications and tracks customer discounts and loyalty rewards.

Problem Analysis:

Problem	Impact	Analysis	Solution
File Pointer Issues in Appointment Management Modules	Data integrity compromise and potential data loss	The file pointer inaccurately pointed to a temporary file, leading to issues in appointment management	A thorough review of file pointer operations, correction of file handling logic, and validation checks were implemented
Difficulty in Debugging and Maintaining Extensive Code	Increased development time, potential introduction of bugs	The extensive codebase posed challenges in debugging and maintenance	Code modularization, commenting, and adherence to coding standards were implemented. Debugging tools and practices were employed
Specific Problems Related to DMA	Memory leaks, segmentation faults	Dynamic Memory Allocation (DMA) issues led to memory leaks and segmentation faults	String manipulation functions were rigorously validated. Memory deallocation mechanisms were enhanced to prevent leaks

Details of Problem Analysis: The solution design of SalonPro revolves around modular and structured programming principles to ensure scalability, maintainability, and ease of understanding.

Appointment Management: In the appointment management module, a robust solution was implemented to address file pointer issues. The function **bookAppointment** in the main module handles the booking process. It appropriately manages file pointers to prevent data integrity compromise. The appointment details are stored in a separate file ("appointments.txt"), ensuring organized data storage.

Code Maintainability: To address the challenge of debugging and maintaining an extensive codebase, code modularization and commenting practices were employed. Functions were logically organized to enhance code readability. Header files were utilized to declare functions, providing a clear interface between modules. This approach not only facilitates easier debugging but also ensures that future modifications are more straightforward.

Dynamic Memory Allocation (DMA) Enhancement: Given the specific problems related to DMA, the service and staff management modules were scrutinized. In the service management module, memory for services is dynamically allocated using **realloc** when adding a new service. Proper error handling ensures graceful degradation in case of memory allocation failure. Similarly, in the staff management module, memory for staff members is allocated dynamically to accommodate additions and removals. This approach minimizes memory leaks and prevents segmentation faults.

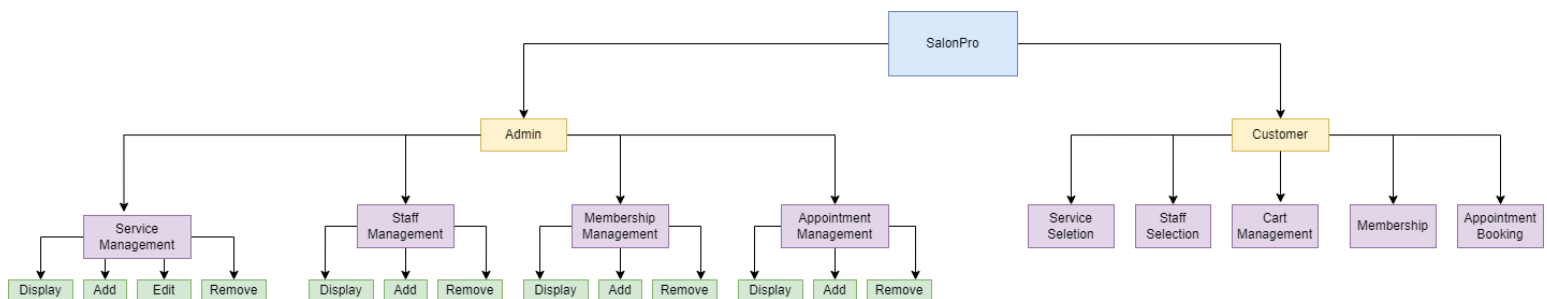
Solution Design (Project Detail, Functionality, and Features):

- Implementation of structures for every management module.
- Utilization of arrays for efficient data storage and retrieval.
- Inclusion of conditional statements (IF, Case) for precise flow control and validation.
- Integration of various loops (For, While, Do While, Nested) to handle iterative tasks effectively.
- Effective use of both built-in and user-defined functions to enhance functionality and code organization.
- Application of string manipulation techniques for membership and booking functionalities.
- Selective use of recursion in displaying memberships for concept inclusion

- Incorporation of pointers for efficient data handling, particularly in staff and salary management modules where arrays have been used. Dynamic Memory Allocation (DMA) employed in conjunction with pointers for optimized memory usage.
- File handling mechanisms implemented for data storage and retrieval in modules such as appointment management and membership management.
- Comprehensive documentation of code for improved maintenance and future enhancements.
- Prioritization of input validation, error handling, and security measures to ensure robust program behavior.

***NOTE: Further project details are attached in the spreadsheet provided below.**

Structure Flow Chart:



Implementation & Testing: The implementation phase involved the meticulous translation of design into code, with an emphasis on modular and structured coding practices. Rigorous testing, including unit testing, integration testing, and user acceptance testing, ensured the reliability and accuracy of the system. Each module underwent individual testing to identify and rectify issues, ensuring that the system functions seamlessly.

Project Breakdown Structure (Workload Distribution with Timeline):

1. **Design and Planning:** 1 week
2. **Implementation:** 1 week
3. **Testing, Debugging, Documentation, Final Review:** 2 weeks

For effective workload distribution and project management, the team employed a dynamic spreadsheet. This spreadsheet served as a live update and tracking tool, allowing team members to monitor individual tasks, track progress, and promptly address any deviations from the timeline. Regular meetings were conducted to discuss updates and adjust the project plan as needed, ensuring a well-coordinated and efficient development process.

(Link:https://docs.google.com/spreadsheets/d/1NRqfhstJQ7nLBhFYbpBImJgT4f3xYX6_4h_qs9Ap6Y/edit?usp=sharing)

Results (Outputs Screenshots): Screenshots showcasing key outputs, including service selection, staff selection, cart management, and appointment booking, are attached in the appendix.

```
Login for:
1. Customer
2. Admin
0. Exit
Enter Number: 1

-----Welcome to SalonPro: Streamlining Beauty Services!-----

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 1

-----Choose a Service-----

Services:
1. Manicure $20
2. Pedicure $35
3. Shampoo & Blowout $42
4. Haircut $98
5. Hair Color - Root Touch-Up $67
6. Hair Color - Full Highlights $135
7. Hair Color - Balayage/Ombre $250
8. Hair Styling - Updo/Event Styling $65
9. Hair Styling - Extensions $670
10. Waxing - Facial $20
11. Waxing - Bikini $45
12. Waxing - Full Body $80
13. Makeup - Everyday/Party $60
14. Makeup - Bridal $250

Enter Service Number: 2

Service 'Pedicure' added to your cart.
Do you want to add more services? (y/n): y

-----Choose a Service-----

Services:
1. Manicure $20
2. Pedicure $35
3. Shampoo & Blowout $42
4. Haircut $98
5. Hair Color - Root Touch-Up $67
6. Hair Color - Full Highlights $135
7. Hair Color - Balayage/Ombre $250
8. Hair Styling - Updo/Event Styling $65
9. Hair Styling - Extensions $670
10. Waxing - Facial $20
```

```
9. Hair Styling - Extensions $670
10. Waxing - Facial $20
11. Waxing - Bikini $45
12. Waxing - Full Body $80
13. Makeup - Everyday/Party $60
14. Makeup - Bridal $250

Enter Service Number: 9

Service 'Hair Styling - Extensions' added to your cart.
Do you want to add more services? (y/n): n

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 2

----- Staff List -----

1. Nabira Khan Available
2. Omama Available
3. Aiman Nadeem Available
4. Aisha Asif Not Available
5. Afaf Shahid Available

Enter Staff Number: 3

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 3

----- Your Shopping Cart -----

Selected Services:
2. Pedicure $35
9. Hair Styling - Extensions $670
No Membership Discount Applied

Total Amount: $705.00

Do you want to remove a service? (y/n): y

Enter the index of the service to remove: 2
```

```
Enter the index of the service to remove: 2
Service 'Pedicure' removed from the cart.
Do you want to remove a service? (y/n): n

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 3

----- Your Shopping Cart -----

Selected Services:
9. Hair Styling - Extensions $670
No Membership Discount Applied

Total Amount: $670.00

Do you want to remove a service? (y/n): n

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 4

Enter your name: Kylee

Do you already have a membership? (y/n): n

Would you like to purchase a membership? (y/n): y

Membership Options:
1. Silver Membership $50/month
2. Gold Membership $80/month
3. Platinum Membership $120/month

Enter the number corresponding to your chosen membership: 1

Membership purchased successfully!
Membership discount applied.
```

```
Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 3

----- Your Shopping Cart -----

Selected Services:
9. Hair Styling - Extensions $670
Membership Discount Applied: $60.30

Total Amount: $603.00

Do you want to remove a service? (y/n): n

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 5

Enter preferred appointment date (YYYY-MM-DD): 2023-12-05
Enter preferred appointment time in 24HR format (HH:MM): 07:00

Invalid date or time. Please choose a valid date and time.

Enter preferred appointment date (YYYY-MM-DD): 2023-12-05
Enter preferred appointment time in 24HR format (HH:MM): 12:00

Appointment booked successfully!
Details: Staff: Aiman Nadeem, Time: 12:00, Date: 2023-12-05
Total Amount: $603.00

Customer Options:
1. Service Selection
2. Staff Selection
3. Cart Management
4. Membership
5. Book Appointment
0. Exit
Enter Option: 0

Login for:
```

```
2. Admin
0. Exit
Enter Number: 2

Enter Admin Username: admin
Enter Admin Password: Salon1234

Authentication successful. Welcome, Admin!

Admin Options:
1. Staff Management
2. Service Management
3. Appointment Management
4. Membership Management
0. Exit
Enter Option: 1

Staff Management Options:
1. Display Staff
2. Add Staff
3. Remove Staff
4. Edit Staff Member
0. Back to Main Menu
Enter your choice: 1

----- Staff List -----

Name Salary Skill Availability
1. Nabira Khan 5000.00 Hair Stylist Available
2. Omama 4500.00 Manicurist Available
3. Aiman Nadeem 6000.00 Color Special Available
4. Aisha Asif 5500.00 Makeup Artist Not Available
5. Afaf Shahid 5200.00 Waxing Special Available

Staff Management Options:
1. Display Staff
2. Add Staff
3. Remove Staff
4. Edit Staff Member
0. Back to Main Menu
Enter your choice: 2

Enter staff name: Kim Kate
Enter staff salary: 2300
Enter staff skill: Styling
Is staff available? (1 for Yes, 0 for No): 0

Staff member added successfully!

Staff Management Options:
```

```
Staff Management Options:
1. Display Staff
2. Add Staff
3. Remove Staff
4. Edit Staff Member
0. Back to Main Menu
Enter your choice: 3

----- Staff List -----

Name Salary Skill Availability
1. Nabira Khan 5000.00 Hair Stylist Available
2. Omama 4500.00 Manicurist Available
3. Aiman Nadeem 6000.00 Color Special Available
4. Aisha Asif 5500.00 Makeup Artist Not Available
5. Afaf Shahid 5200.00 Waxing Special Available

Enter the number corresponding to the staff member to remove: 6

Staff member removed successfully!

Staff Management Options:
1. Display Staff
2. Add Staff
3. Remove Staff
4. Edit Staff Member
0. Back to Main Menu
Enter your choice: 4

----- Staff List -----

Name Salary Skill Availability
1. Nabira Khan 5000.00 Hair Stylist Available
2. Omama 4500.00 Manicurist Available
3. Aiman Nadeem 6000.00 Color Special Available
4. Aisha Asif 5500.00 Makeup Artist Not Available
5. Afaf Shahid 5200.00 Waxing Special Available

Enter the number corresponding to the staff member to edit: 4

Current Details for Aisha Asif:
1. Name: Aisha Asif
2. Salary: 5500.00
3. Skill: Makeup Artist
4. Availability: Not Available
Enter the number corresponding to the detail to edit (0 to go back): 4
Is the staff member available? (1 for Yes, 0 for No): 1

Staff Management Options:
1. Display Staff
2. Add Staff
```

```

15. Cutting                                     $1200
Enter the number corresponding to the service to edit: 15

Enter the new name for the service: Cutting Hair
Enter the new price for the service: 1200

Service edited successfully!

Service Management Options:
1. Display Services
2. Add Service
3. Remove Service
4. Edit Service
0. Back to Main Menu
Enter your choice: 3

Services:
1. Manicure                                     $20
2. Pedicure                                    $35
3. Shampoo & Blowout                            $42
4. Haircut                                     $98
5. Hair Color - Root Touch-Up                  $67
6. Hair Color - Full Highlights                 $135
7. Hair Color - Balayage/Ombre                 $250
8. Hair Styling - Updo/Event Styling           $65
9. Hair Styling - Extensions                   $670
10. Waxing - Facial                            $20
11. Waxing - Bikini                            $45
12. Waxing - Full Body                         $80
13. Makeup - Everyday/Party                    $60
14. Makeup - Bridal                           $250
15. Cutting Hair                               $1200

Enter the number corresponding to the service to remove: 15

Service removed successfully!

Service Management Options:
1. Display Services
2. Add Service
3. Remove Service
4. Edit Service
0. Back to Main Menu
Enter your choice: 1

Services:
1. Manicure                                     $20
2. Pedicure                                    $35
3. Shampoo & Blowout                            $42
4. Haircut                                     $98
5. Hair Color - Root Touch-Up                  $67

```

```

2. Omaima 2
3. Ali 3
4. Smiayah 1
5. Omar 2
6. Kylee 1
7. Sam 2

Enter the index of the membership to remove: 7

Membership removed successfully!

Membership Management Options:
1. Display Memberships
2. Add Membership
3. Remove Membership
0. Back to Admin Menu

Enter your choice: 1

Memberships:
Nabira 1
Omaima 2
Ali 3
Smiayah 1
Omar 2
Kylee 1

Membership Management Options:
1. Display Memberships
2. Add Membership
3. Remove Membership
0. Back to Admin Menu

Enter your choice: 0

Admin Options:
1. Staff Management
2. Service Management
3. Appointment Management
4. Membership Management
0. Exit

Enter Option: 0

Login for:
1. Customer
2. Admin
0. Exit

Enter Number: 0

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```

Conclusion (Summary & Discussion): In conclusion, SalonPro successfully addresses critical challenges faced by the salon industry. The project not only provides customers with a seamless and efficient platform but also equips salon administrators with powerful tools for operational management. The incorporation of DMA, extensive codebase, and file handling issues were thoroughly analyzed and resolved, showcasing the team's commitment to delivering a robust solution.

SalonPro serves as a testament to the team's proficiency in C programming and their ability to translate theoretical concepts into practical, industry-relevant applications. The continuous improvement and refinement of the system, coupled with comprehensive testing, ensure that SalonPro meets the highest standards of quality and usability. The project's success lies in its ability to integrate theoretical knowledge with practical application, providing a valuable learning experience for the team.

Group Details:

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Omaima Afaq – **23K-0044**

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