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UNIVERSITY OF MAURITIUS

BSc Software Engineering

To: Mr. Dassen Sathan

Module: Software Verification and Validation

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1 introduction

1.1 Description of project

In just a few seconds, this system will enable a customer to book an appointment at Nails&Makeup. The salon offers different services such as manicures, pedicures, and make-up. The services will be allocated on different days, for instance, manicures will be done only on Mondays, Thursdays, and Saturdays, pedicures on Wednesdays and Sundays, and make-up on Tuesdays and Fridays. The list of days and services will be available on a service option. A list of options will be available for each category and the customer will have to choose one or more depending on their liking. After selection, the system will prompt the user to confirm the booking. After confirmation, an email will be sent to the customer marking the confirmation of the booking.

The project has the following functionalities:

- Menu Screen
- Log in, Sign Up or Exit
- Choose Service
- Choose day
- Booking
- Exit system

1.2 System Requirements

Performance:

1) The system should provide a response in about 5 to 10 seconds.
2) The system shall be able to load in 1 to 2 seconds of opening or clicking on something.

Usability:

1) The system shall be user friendly so that users feel comfortable using it.
2) The system shall be responsive enough to accommodate 20 users at a time.

Security:

1) The user should get an error message if their username or password is invalid.
2) The system shall be able to check who has access to the system by demanding a password for security purposes as well as a specification of not less than 7 characters.
3) The system shall be able to secure any transaction involved between the customer and the company

Availability:

1) The system shall be available 24 hours a day, 7 days a week.
2) The system shall be able to work in less than 24 hours if the system crashes.

Ethical:

1) The system shall act ethically by helping the user but not make any choice for the user.

1.3 Modules

There are 3 types of modules in this phase namely:

- User Module
- System Module
- Administrator Module

The functionality for each module is provided below:

User Module

The user should be able to login in the application to make her appointment for the service being provided such as pedicure, manicure and facial.

Booking should be confirmed for a particular date according to the user.

System Module

The selection to book for a particular appointment should be done by the user according to their needs. The booking should display immediately after the client has already selected what she wants to do.

Administration Module

The administrator should be able to change the different time and date in case of emergency. The administrator should inform when there is discount on the price of the service provided especially during festive mood.

2 Equivalence

2.1 Partitions and boundaries

Condition	Valid partition	Invalid partition	Valid boundaries	Invalid boundaries
User name	First alphabet in upper case followed by lower case characters. Length should be between 9 to 20.	First character is not upper case. Length<9 Length>20 Numeric. Null value	Haileybieber Selenagomez	AustinMcBroom Fallon darcy aaaaabbbghduhgjoklhgfju 23 ----
Password	Alphabetical, must contain a special character (#, _, &) and an upper case alphabet in whatever order Length should be 8 to 14.	Another special charcter other than (#, _, & Numeric Length<8 Length>14	deeessHaa& Saraaaaah_ raKkss#ha	Deesha khilesh esHa! 56210 Yassir_ VirginiaMiller#

First name	Should contain only [a-z] and [A-Z] Length between 3-30	Numeric Length<3 Length>30 Null value	Mia Abigail jenna	zo Xavier12 520
Last name	Should contain only [a-z] and [A-Z] Length between 3-30	Numeric Length<3 Length>30 Null value	Martinez Hendersonabel	De aa 10 Jnshufjalomkopslnhfgcvqrhfomjkdlop
Age	Should be between 18 to 99 Numeric	Alphabetical Age<18 Age >99 Negative Null value	18 50	0 -1 123
Email address	Alphanumeric followed by a character “@” follow by alphabets followed by a dot “.”	Symbols (expect the “@” and “.” symbols) Email without the symbol	Deeshabeera@gmail.com Raksha07geerna@hotmail.com Hailey1502@umail.ac.mu	&^^%%@gmail.com dbvdksdjb@ojoj.ac.kov violet@kitty.yo.kov neo.331@gmail.com

	Followed by a valid domain name	“@” and “.”	Allanven2803@yahoo.com	abellA@hotmail.123

2.2 Equivalence classes

1. User name is alphabetical. (valid)
2. User name is non-alphabetical. (invalid)
3. User name starts with an upper case alphabet. (valid)
4. User name starts with a lower case alphabet. (invalid)
5. User name is 9 to 20 characters in length. (valid)
6. User name is less than 9 characters in length. (invalid)
7. User name is more than 20 characters in length. (invalid)

8. Password is alphabetical. (valid)
9. Password is non-alphabetical. (invalid)
10. Password contains only upper case characters. (valid)
11. Password contains only lower case characters. (invalid)
12. Password contains the special characters (#, _, &). (valid)
13. Password contains other special characters. (invalid)
14. Password is 8-14 characters in length. (valid)
15. Password is less than 8 characters in length. (invalid)
16. Password is more than 14 characters in length. (valid)

17. Choice is numeric. (valid)
18. Choice is non-numeric. (invalid)
19. Choice is less than 1. (invalid)
20. Choice is 1 to 3. (valid)
21. Choice is more than 3. (invalid)

22. First name is alphabetical. (valid)
23. First name is non-alphabetical. (invalid)
24. First name contains only [a-z] & [A-Z]. (valid)
25. First name is numeric. (invalid)
26. First name contains 3 to 30 characters in length. (valid)
27. Firs name is less than 3 characters in length. (invalid)
28. First name is more than 30 characters in length. (invalid)

29. Last name is alphabetical. (valid)
30. Last name is non-alphabetical. (invalid)
31. Last name contains only [a-z] & [A-Z]. (valid)
32. Last name is numeric. (invalid)
33. Last name contains 3 to 30 characters in length. (valid)
34. Last name is less than 3 characters in length. (invalid)
35. Last name is more than 30 characters in length. (invalid)

36. Age is numeric. (valid)
37. Age is not numeric. (invalid)
38. Age is between 18 to 99. (valid)
39. Age is less than 18. (invalid)
40. Age is more than 99. (invalid)

41. Email address is alphanumeric. (valid)
42. Email address is not alphanumeric. (invalid)
43. Email address contains '.'. (valid)
44. Email address contains '@'. (valid)
45. Email address does not contain '.'. (invalid)
46. Email address does not contain '@'. (invalid)

47. Option is numeric. (valid)
48. Option is alphabetical. (invalid)
49. Option is between 1 to 3. (valid)

50. Option is less than 1. (invalid)
51. Option is greater than 3. (invalid)

52. Day is alphabetical. (valid)
53. Day is numeric. (invalid)
54. Day is Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday. (valid)

55. Service is alphabetical. (valid)
56. Service is numeric. (invalid)
57. Service is makeup, manicure and pedicure. (valid)

2.3 Test cases

Test cases are based upon the equivalence class to be able to test our data.

Classes covered - which classes has been met in the equivalence class

#	Test Data	Expected result	Classes covered
1	First name: Deesha Last name: IsTamam Age: 21 Email ddress:deeshaistamam@gmail.com User name: Wazaadeesha Password: Allanmonamour28 Login Successful: yes Valid service: Manicure Valid day: Monday Confirm booking: yes	T	1,2,3,4,5,6,8,9,10, 11,12,14,16,22,23, 24,26,28,29,30,31, 33,35,36,38,41,43, 44
2	Last name: IsTam:(	F	29,30,31,32,33,34, 35
3	Last name: am07	F	29,30,31,32,33

4	First name: dess,666	F	22,23,24,25,26
5	First name: de	F	26,27
6	Age: 17	F	36,38,39
7	Age: Ab	F	36,37
8	Email address: qetycim	F	41,42,43,44,45,46,
9	Email address: qety.com	F	41,42,43,44,45,46
10	Email address: deeshaistamam@gmail.com	T	41,43,44,42,45,46
11	User name: deeshatamam	F	1,4,5,2,3,6
12	User name: Deeshatamam:	F	2,3,5,4,6
13	User name: Deesatamam	T	1,3,5,2,4,6
14	Password: Tashamonamour18&	T	8,12,14,16,9,10,11,13
15	Password: tashamonamour	F	8,11,9,10,12,13
16	Password: tashamonamour;	F	9,13,10,11,12
17	Day: lundi	F	52,53,54
18	Day: Uday6	F	53,52,54
19	Day: Saturday	T	52,54,53
20	Service: Facial	F	55,56,57
21	Service: Waxing	F	55,56,57
22	Service: Manicure	T	55,57,56

3. Description of basic and alternative flow

3.1 Use case description

Use case name	Choose Service (manicure, pedicure, makeup)
Brief description	The process for which the customer has to do booking for the service.
Participating actor	Customer
Pre-condition	The system is working. An internet connection is required.
Basic flow of events	1. The user selects the sign-up option from menu. 2. The system displays the sign-up screen to the user. 3. The user enters her first name. 4. The user enters her last name. 5. The user enters her age. 6. The user enters her email address. 7. The user enters her user name. 8. The user enters her password. 9. The system validates all the above credentials. 10. The system display “Successful login”. 11. The system displays “Choose a service”. 12. The user chooses an appropriate service. 13. The user enters her day on which she wants to do her booking. 14. The system validates the day. 15. The system confirms the booking. 16. The system books the day for the particular user. 17. The use case ends.
Alternative flow	**AF1.Not Sign-up** If in step 1 of the basic flow of events, the user does not choose sign up then, 1. The user can choose log in. 2. The use case resumes at step7 of the basic flow of events. **AF2. Invalid first name**

	If in step 3 of the basic flow of events, the user enters an invalid first name then
	1. The system displays an error message “invalid first name.”
	2. The use case resumes at step 3 of the basic flow of events.
	
	AF3.Invalid last name
	If in step 4 of the basic flow of events, the user enters an invalid user name, then
	1. The system displays an error message “invalid last name”.
	2. The use case resumes at step 4 of the basic flow of events.
	
	AF4.Invalid age
	If in step 5 of the basic flow of events, the user enters an invalid age, then
	1. The system displays an error message “invalid age”.
	2. The use case resumes at step 5 of the basic flow of events.
	
	AF5.Invalid email address
	If in step 6 of the basic flow of events, the user enters an invalid email address then
	1. The system displays an error message “invalid email address”.
	2. The use case resumes at step 6 of the basic flow of events.
	
	AF6.Invalid User First name
	If in step 7 of the basic flow of events, the user enters an invalid user name, then
	1. The system displays an error message “an invalid user name”.
	2. The use case resumes at step 7 of the basic flow of events.

	AF7.Invalid password In step 8 of the basic flow of events, the user enters an invalid password then, 1. The system displays an error message “invalid password” 2. The use case resumes at step 8 of the basic flow of events. **AF8.Login not successful** In step 10 of the basic flow of events, the login is not successful then, 1. The user must sign-up again. 2. The use case resumes at step1 of the basic flow of events. **AF9.Invalid service** In step 12 of the basic flow of events, the user has not chosen an appropriate service then, 1. The system prompts the user to enter a valid service. 2. The use case resumes at step 11 of the basic flow of events. **AF10.Invalid day** In step14 of the basic flow of events, the user enters an invalid day then, 1. The system displays an error message “invalid day”. 2. The use case resumes at step14. **AF11.Cancel booking** In step15 of the basic flow of events, the user cancels the booking then, 1. The system cancels the booking. 2. The use case ends. **AF12.Booking not confirm**

	In step16 of the basic of the events, the user does not confirm the booking then, 1. The system displays an invalid confirmation. 2. The use case ends.
Post-condition	1. The user signs up successfully with all valid credentials (first name, last name, age, email address, user name, and password). 2. The user books a service successfully.

3.2 Scenario Matrix

Scenario ID	Starting Flow	First Alternate	Second Alternate	Third Alternate
Scenario 1	Basic Flow			
Scenario 2	Basic Flow	A3		
Scenario 3	Basic Flow	A4		
Scenario 4	Basic Flow	A5		
Scenario 5	Basic Flow	A6		
Scenario 6	Basic Flow	A7		
Scenario 7	Basic Flow	A8		
Scenario 8	Basic Flow	A9		
Scenario 9	Basic Flow	A11		
Scenario 10	Basic Flow	A13		
Scenario 11	Basic Flow	A15		

Scenario 12	Basic Flow	A16		

Scenario ID	Starting flow	First Alternate	Second Alternate	Third Alternate
Successful Booking	Basic flow			
Invalid first name	Basic flow	AF2		
Invalid last name	Basic flow	AF3		
Invalid age	Basic flow	AF4		
Invalid email address	Basic flow	AF5		
Invalid user name	Basic flow	AF6		
Invalid password	Basic flow	AF7		
Login unsuccessful	Basic flow	AF8		
Invalid service	Basic flow	AF9		
Invalid day	Basic flow	AF10		
Cancel booking	Basic flow	AF11		
Booking not confirm	Basic flow	AF12		

3.3 Test case matrix

3.3.1 Test cases

Test case	Scenario	First name	Last name	age	Email address	User name	password	Login successful	Valid service	Valid day	Confirm booking	Expected result
BS1	Successful booking	v	v	v	v	v	v	v	v	v	v	Display a little note for booking done
BS2	Invalid first name	l	-	-	-	-	-	-	-	-	-	Error message back to step 3
BS3	Invalid last name	-	l	-	-	-	-	-	-	-	-	Error message back to step 4
BS4	Invalid age	-	--	l	-	-	-	-	-	-	-	Error message back to step 5

BS5	Invalid email address	-	-	-	I	-	-	-	-	-	-	Error message back to step 6
BS6	Invalid username	-	-	-	-	I	--	-	-	-	-	Error message back to step 7
BS7	Invalid password	-	-	-	-	I		-	-	-	-	Error message back to step 8
BS8	Login unsuccessful	I	I	I	I	I	I	I	-	-	-	Display login unsuccessful back to step 2
BS9	Invalid service	-	-	-	-	-	-	-	I	-	-	Error message back to step11
BS10	Invalid day	-	-	-	-	-	-	-	V	I	-	Error message back to step 13

Mu 11	Can cel boo king	-	-	-	-	-	-	I	I	I	I	Displa y bookin g cancel use case end
BS1 2	Boo king not conf irm	-	-	-	-	-	-	I	I	I	I	Displa y bookin g not confir m

Key:

‘-’ – not necessary to provide a data

I – invalid

V – valid

BS1- book service 1

3.2.2 Test data

Test case	Scenario	User input	Expected Results
BS1	Scenario 1- successful booking	First name: Deesha Last name: IsTamam Age: 21 Email Address: deeshaistamam@gmail.com User name: wazaadeesha Password: Allanmonamour28# Login Successful: yes Valid service: Manicure Valid day: Monday Confirm booking: yes	The customer has successfully booked her manicure on the chosen day made by her.
BS2	Scenario 2- Invalid first name	First name: Deesh6 Last name: Nil Age: Nil Email address: Nil User First name: Nil Password: Nil Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	Error message is displayed to the user. The user must re-enter her First name
BS3	Scenario 3- Invalid last name	First name: Nil Last name: 666mam Age: Nil Email address: Nil User name: Nil Password: Nil Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	Error message will be display. The user must re-enter her last name

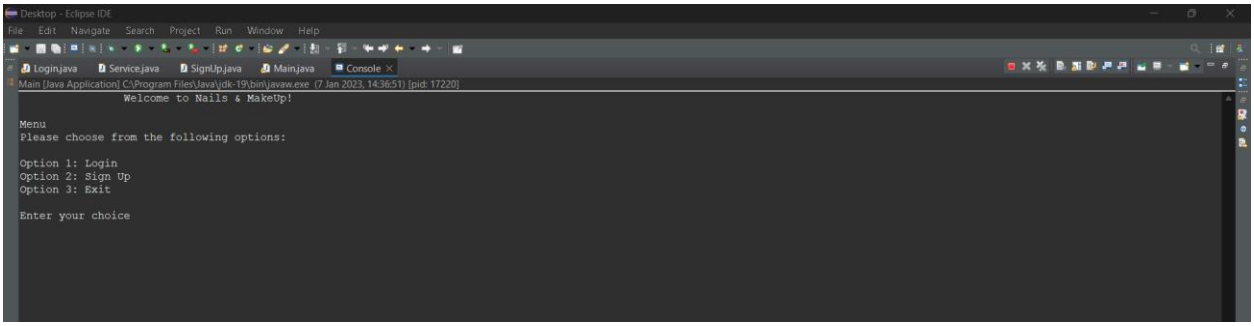
BS4	Scenario 4- Invalid age	First name : Nil Last name: Nil Age: -48 Email address: Nil User First name: Nil Password: Nil Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	Error message will be displayed. The user must re-enter her age.
BS5	Scenario 5- Invalid email address	First name: Nil Last name: Nil Age: Nil Email address: quety.cim User First name: Nil Password: Nil Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	Error message will be display. The user must re-enter her mail.
BS6	Scenario 6- Invalid user name	First name: Nil Last name: Nil Age: Nil Email address: Nil User First name: S1199 Password: Nil Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	Error message will be display. The user must re-enter her User First name.
BS7	Scenario 7- Invalid password	First name: Nil Last name: Nil Age: Nil	Error message will be

		Email Address: Nil User name: Nil Password: ffgg3 Login Successful: Nil Valid service: Nil Valid day: Nil Confirm booking: Nil	display. The user must re-enter her password.
BS8	Scenario 8- Login unsuccessful	First name: Deesh6 Last name: 666mam Age: -48 Email Address: Nil User First name: s1166 Password: ffgg3 Login Successful: No Valid service: Nil Valid day: Nil Confirm booking: Nil	Login unsuccessful as invalid credentials have been entered.
BS9	Scenario 9- Invalid service	First name: Nil Last name: Nil Age: Nil Email address: Nil User First name: Nil Password: Nil Login Successful: Nil Valid service: facial Valid day: Nil Confirm booking: Nil	Error message will appear as this service does not exist in the service provided.
BS10	Scenario 10- Invalid day	First name: Nil Last First name: Nil Age: Nil Email address: Nil User name: Nil Password: Nil Login Successful: Nil	Error message will be displayed. User must re-enter a valid day

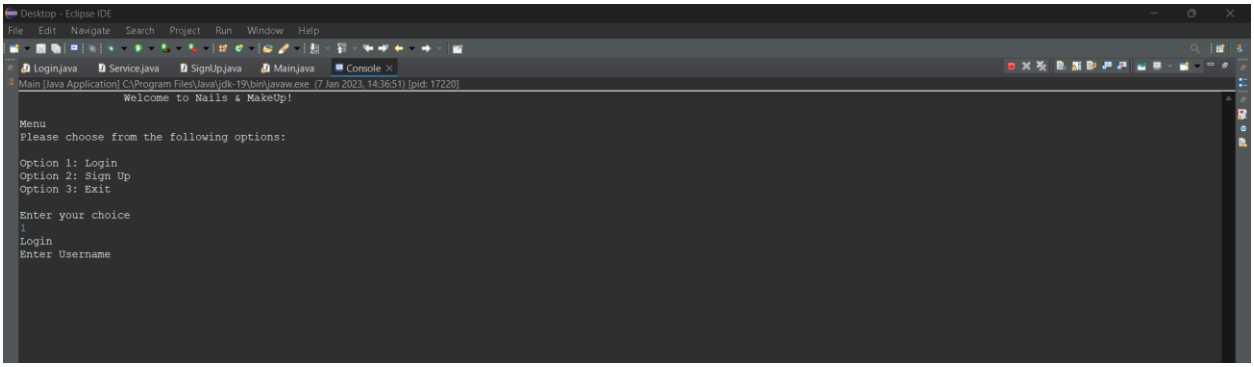
		Valid service: Manicure Valid day: Wednesday Confirm booking: Nil	as the service she has chosen does not match the service.
BS11	Scenario 11- Cancel booking	First name: Nil Last name: Nil Age: Nil Email address: Nil User name: Nil Password: Nil Login Successful: No Valid service: Pedicure Valid day: Wednesday Confirm booking: No	The message “booking has been cancelled”
BS12	Scenario 12- Booking not confirm	First name: Nil Last name: Nil Age: Nil Email Address: Nil User First name: Nil Password: Nil Login Successful: No Valid service: facial Valid day: Thursday Confirm booking: No	The message “Booking not confirm as service is not available”

4 Sample screenshots of outputs of coding

Upon running the program, the Menu screen is displayed.



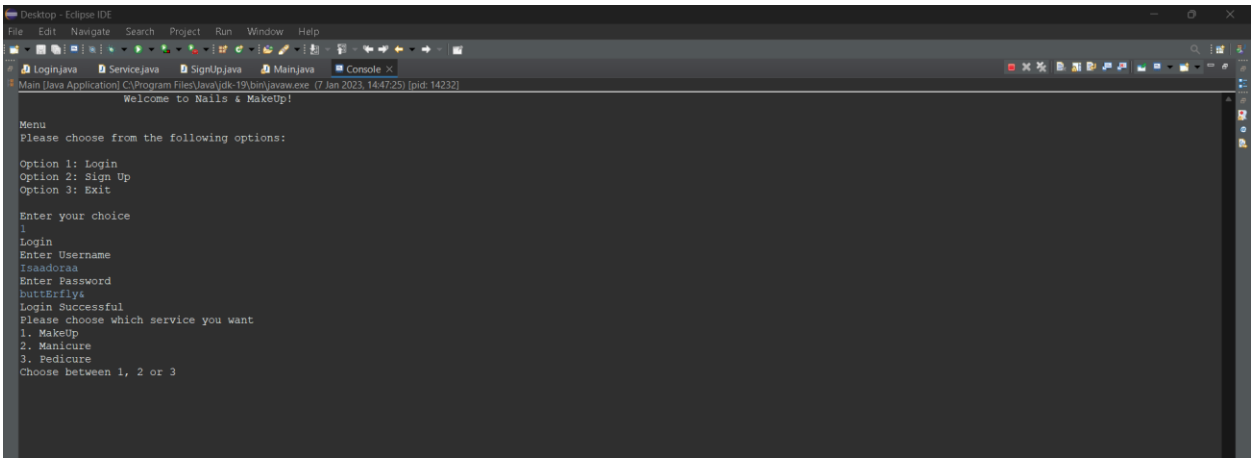
1) The user chooses option 1 to log in.



The system prompts the user to input her user name and password.

The user name should be 9-20 characters in length and the first character must be an upper case.

The password should be 8-14 characters in length, contains an upper case character and a special character from &, _, #.



After entering valid user name and password, the user logs in successfully in the system. The latter prompts the menu of services.

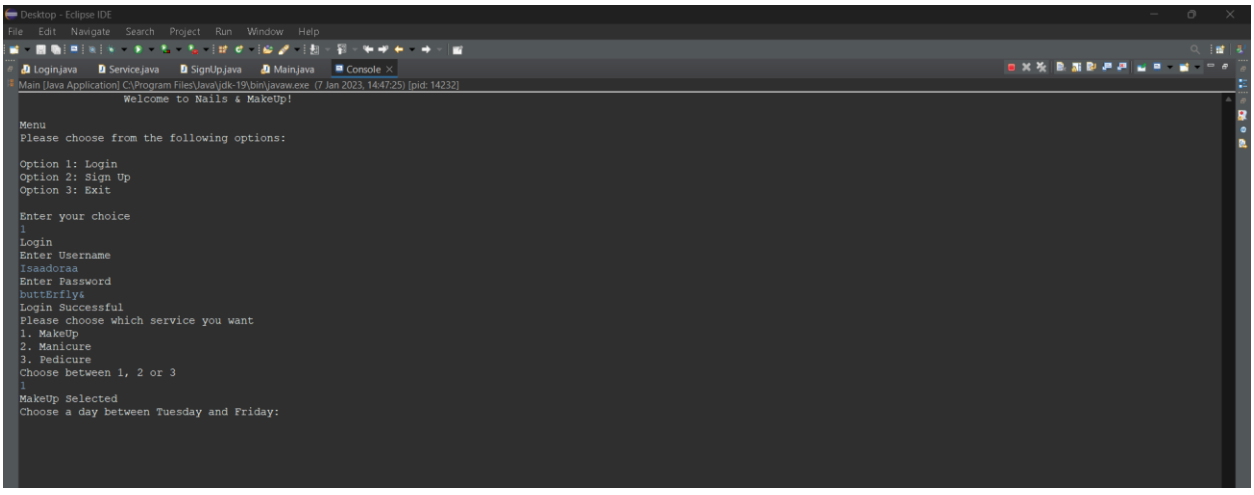
The user has to choose

Option 1: MakeUp

Option 2: Manicure

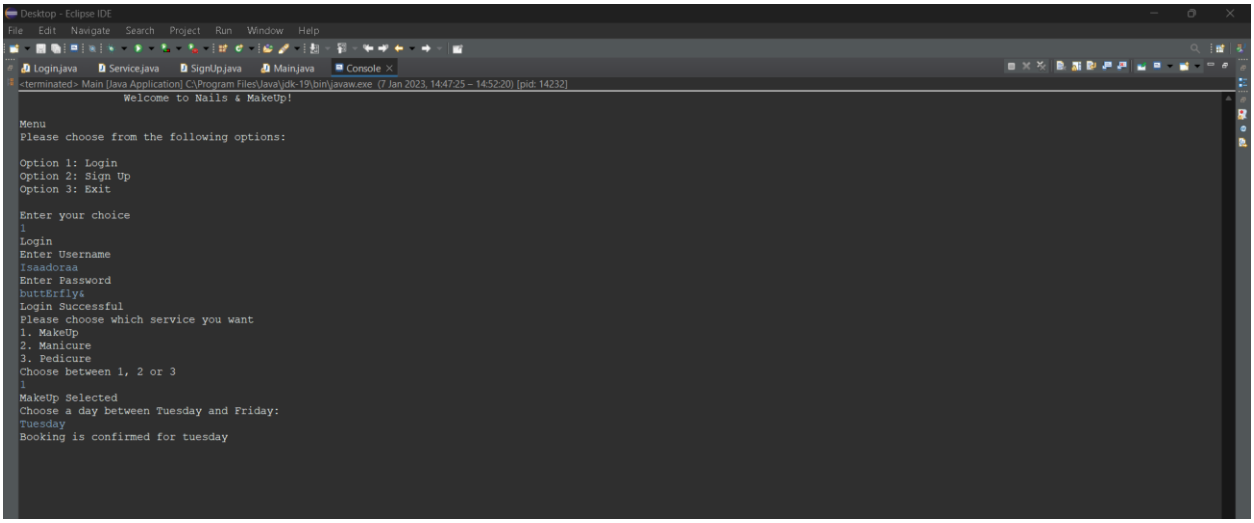
Option 3: Pedicure

The user chooses option 1 – makeup.



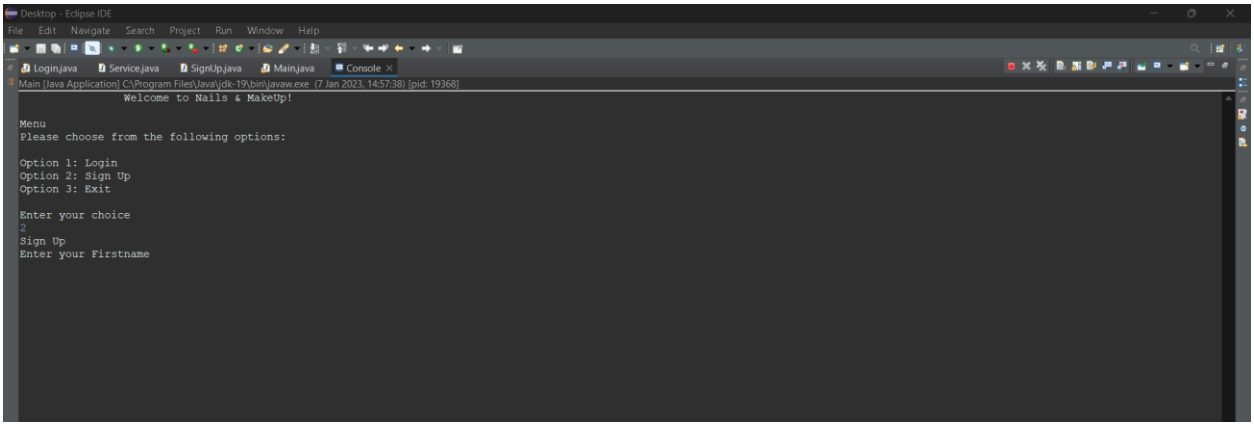
The user then has to choose between Tuesday and Friday for makeup.

Eg. The user chooses Tuesday.



The booking is then confirmed for Tuesday.

2) The user chooses option 2 to sign up in the system.



The system prompts the user to enter her first name, last name, age and email address.

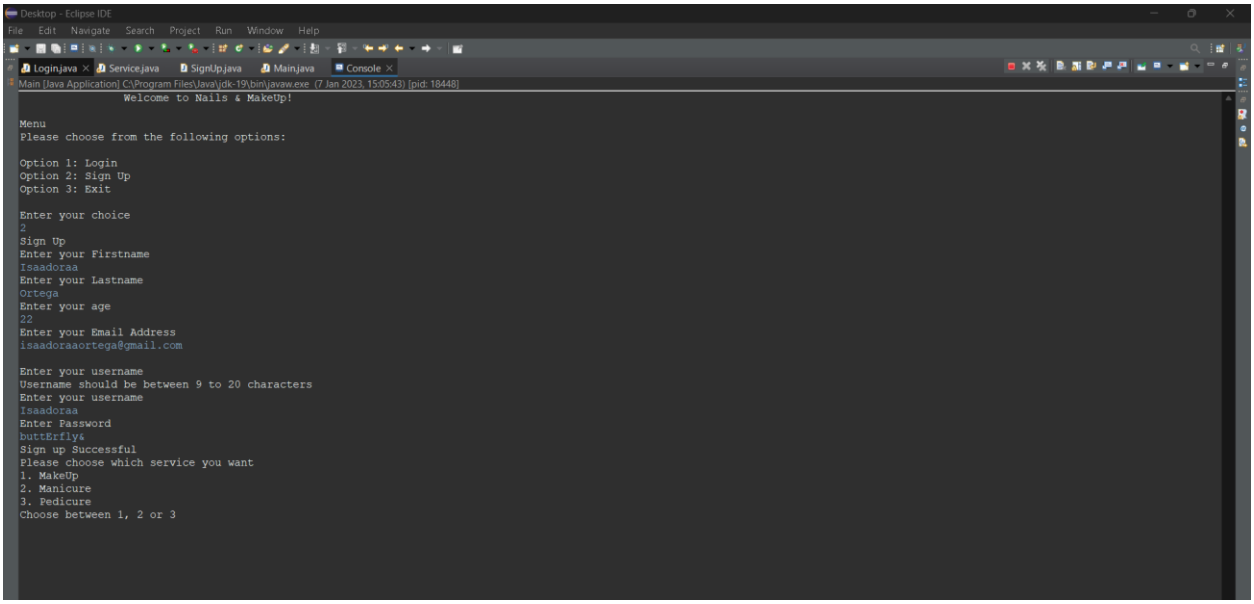
The first name should be 3 to 30 characters in length.

The last name should be 3 to 30 characters in length.

The age should be greater than 18.

The email address should contain “@” and “.”.

Then she has to enter her user name and password.



The user signs up successfully and the system prompts the services.

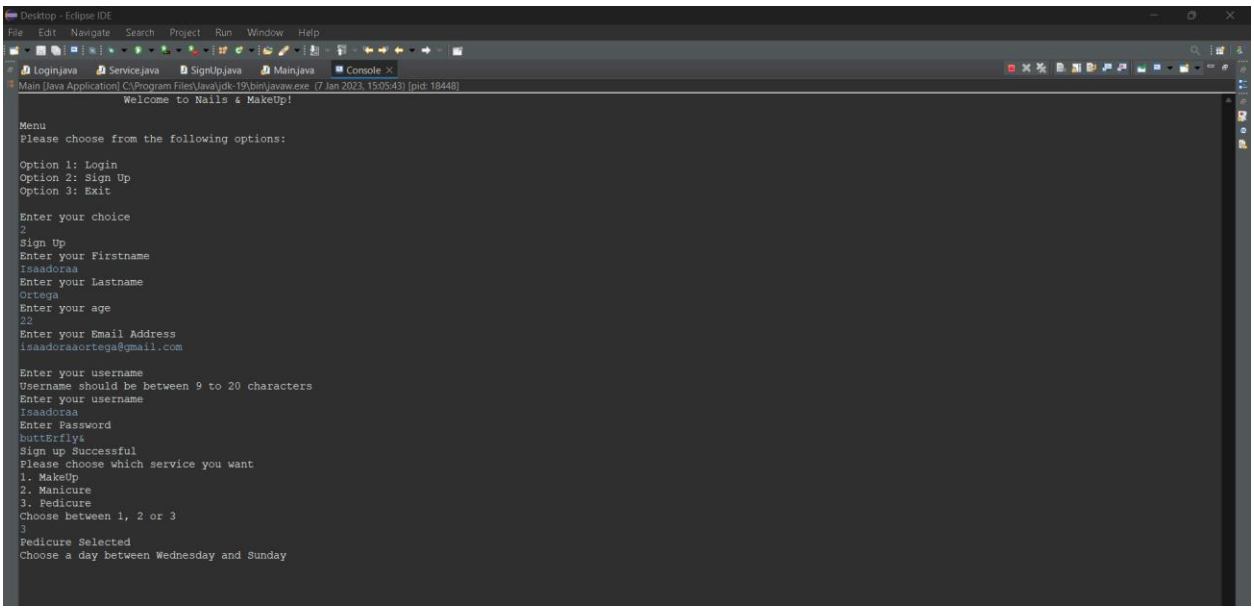
The user has to choose

Option 1: MakeUp

Option 2: Manicure

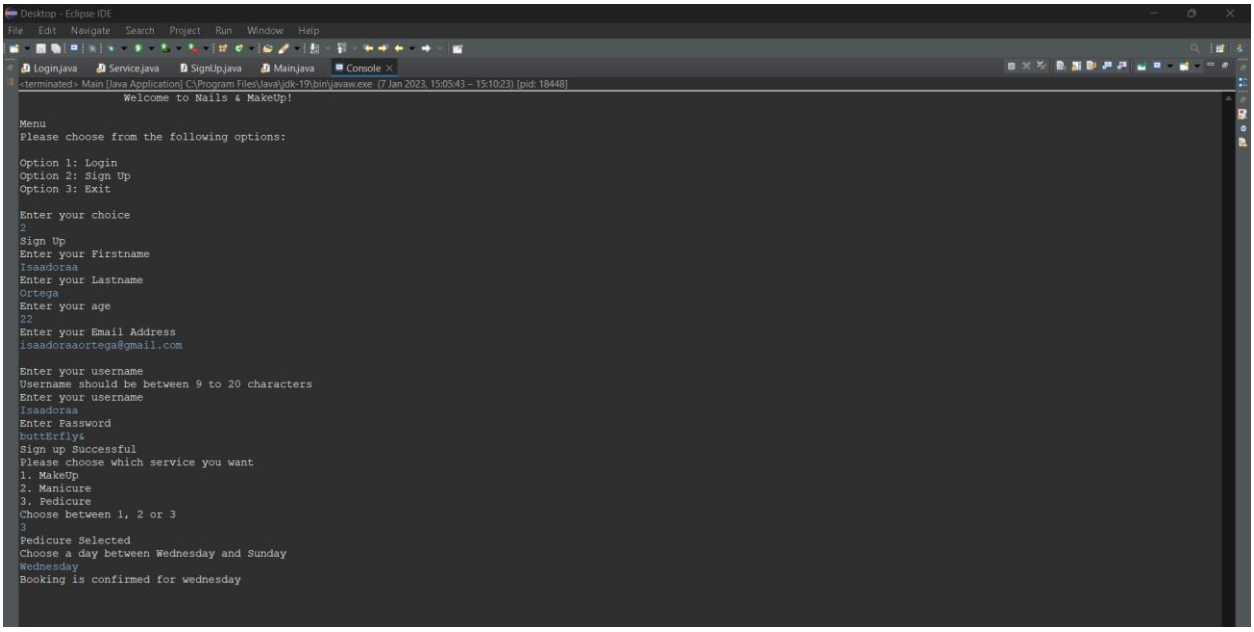
Option 3: Pedicure

Eg. The user chooses option 3 – pedicure



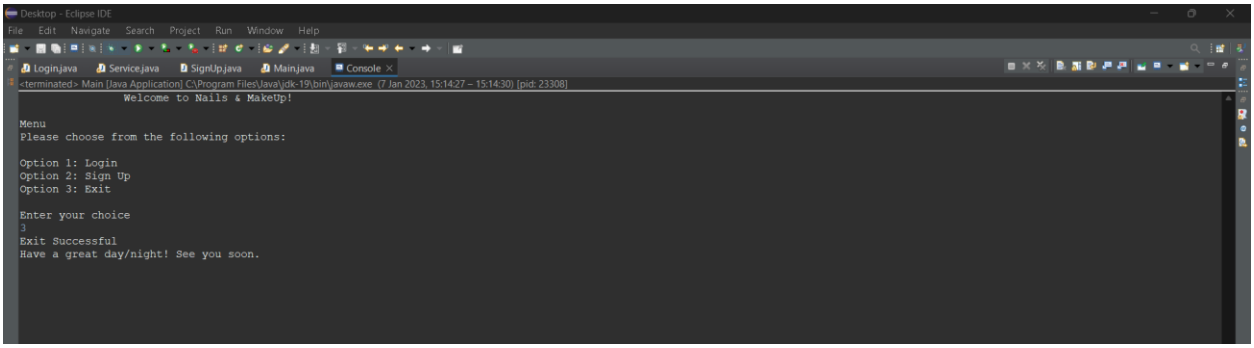
For pedicure, she should choose either Wednesday or Sunday.

Eg. She chooses Wednesday.

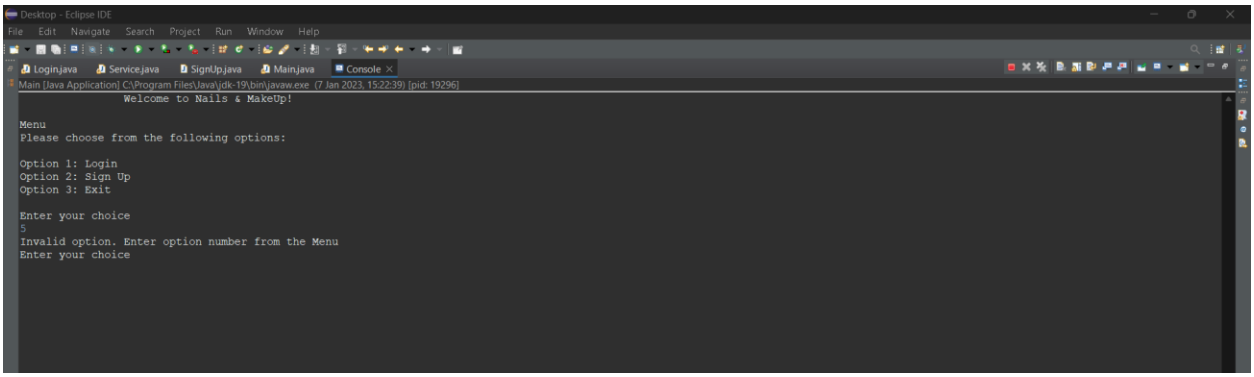


The booking is then confirmed for Wednesday.

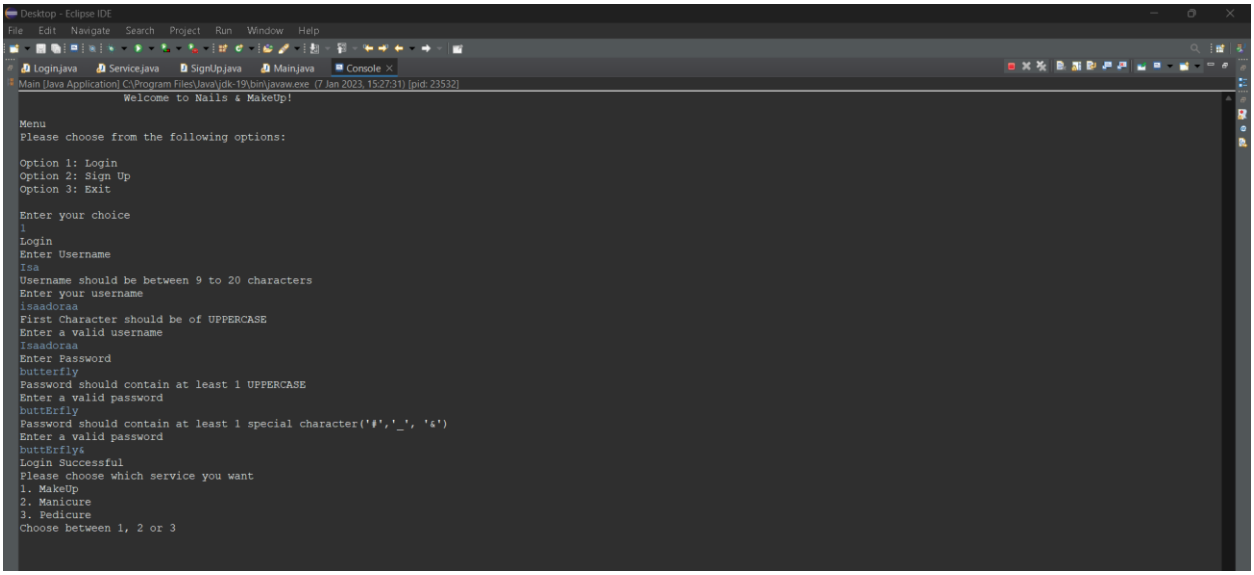
3) The user chooses option 3 to exit the system.

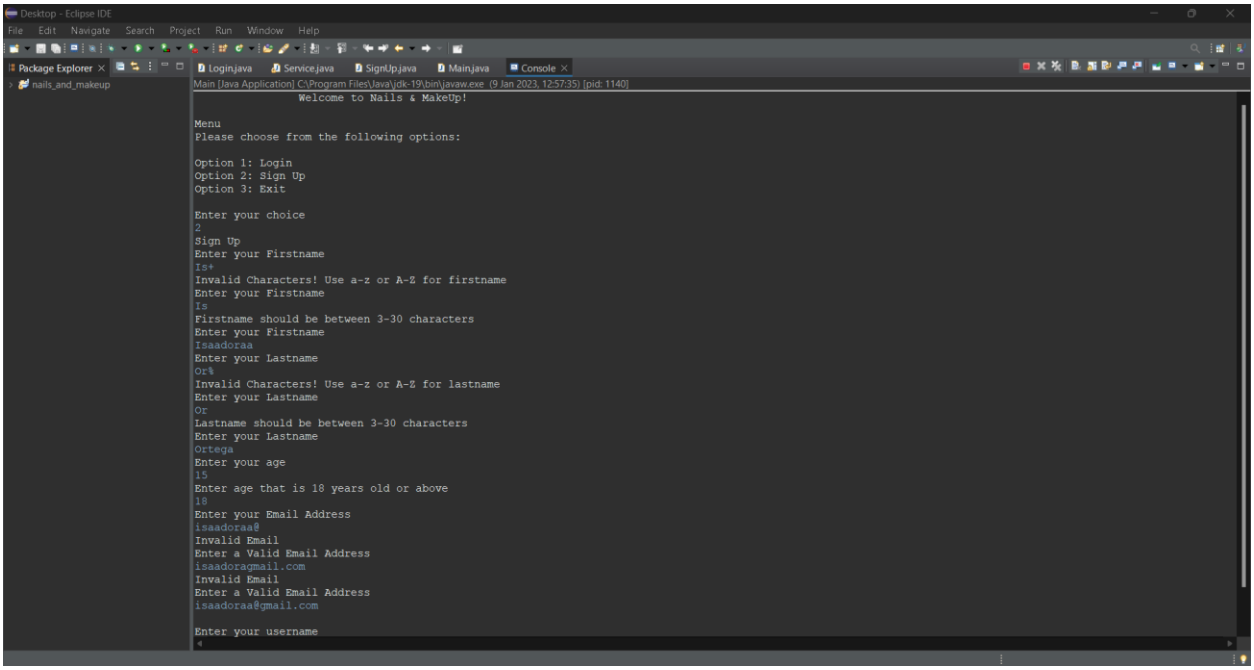


If ever the user inputs an invalid option number which is not on the Menu screen, then it outputs an error message and asks the user to re-enter.



The validations in user name and password



The validations in first name, last name, age and email address

(When all the above credentials are valid, the system prompts the user to enter user name and password.)