Data Structures

Lab Project (Semester-2)

WEBSITE NAVIGATION HIERARCHY

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Title of Project

Website navigation hierarchy

Description of Project

Implement website navigation using linked lists

Overview:

In graphs, there are nodes and set of edges which define relations between nodes.

We have used the same concept to build the website, where each node represents one particular page and have connected them with the help of graph and linked lists.

The code is divided into two sections: left and right.

The left part leads to the Sign-up Page and Verify Email Page, while the right part leads to the Login Page, which further consists of Profile Page and Edit Profile Page.

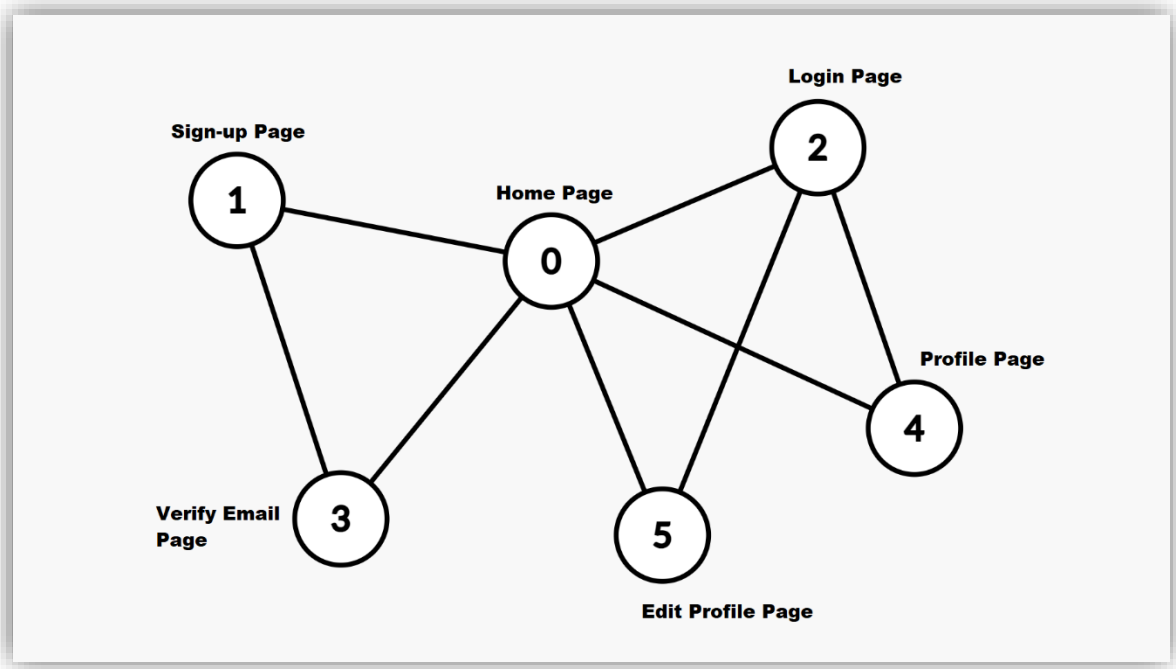
From each part, there are options to Go Back, Go to Home page and Exit from the website.

In the main function, all the links between these nodes or webpages are present.

There is the traversal function, which consists of all the conditions and printf statements. The choices are orderly specified to help the user in navigating the website efficiently.

All the way down, we created design for each webpage option, so as to separate it from the usual menu based program and also enhance the user experience.

The following is the graph structure used in the program.



Code

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<stdbool.h>

struct node {
    char data[1000];
    int index;
    struct node* left;
    struct node* right;
    struct node* back;
    struct node* homeWay;
};


struct node* createNode(char str[],int ind) {
    struct node* temp = (struct node*)malloc(sizeof(struct node));
    strcpy(temp->data,str);
    temp->index=ind;
    temp->left=temp->right=temp->back=temp->homeWay=NULL;
    return temp;
}

void home();
void signup();
void verifyemail();
void login();
void profilepage();
void editprofilepage();
void error();
void exitwebsite();
```

```
void display(int d) {
    if(d==0) home();
    if(d==1) signup();
    if(d==3) verifyemail();
    if(d==2) login();
    if(d==4) profilepage();
    if(d==5) editprofilepage();
}

void traversal(struct node* head) {
    struct node* temp = head;

    bool con = true;

    printf("\n\tWELCOME TO THE WEBSITE%s", head->data);
    home();
    while(con) {
        if(temp->left!=NULL || temp->right!=NULL){
        printf("\n\n1. Go to %s\n",temp->left->data);

        if(temp->right!=NULL)
        printf("2. Go to %s\n",temp->right->data);
        printf("3. Go BACK\n");
        printf("4. Go to HOME PAGE\n");
        printf("5. EXIT WEBSITE\n");
        }
        else{
            printf("\n\n\t*THIS IS END OF THE PAGE*\n\n");
            printf("\n3. Go BACK\n");
            printf("4. Go to HOME PAGE\n");
            printf("5. EXIT WEBSITE\n");
```

```
}
printf("\nEnter the choice: ");
int n;
scanf("%d",&n);

switch (n) {

case 1:
    temp=temp->left;
    printf("\n\n");
    printf("\tPAGE %d",temp->index);
    printf("\n\tWELCOME TO %s\n",temp->data);
    printf("\n");
    if(temp->index==0) display(0);
    if(temp->index==1) display(1);
    if(temp->index==3) display(3);
    if(temp->index==2) display(2);
    if(temp->index==4) display(4);
    if(temp->index==5) display(5);
    /* code */
    break;

 case 2:
    temp=temp->right;
    printf("\n\n");
    printf("\tPAGE %d",temp->index);
    printf("\n\tWELCOME TO %s\n", temp->data);
    printf("\n");
    if(temp->index==0) display(0);
    if(temp->index==1) display(1);
    if(temp->index==3) display(3);
    if(temp->index==2) display(2);
```

```
    if(temp->index==4) display(4);
    if(temp->index==5) display(5);
    break;

case 3:
    if(temp == head) {
        printf("\n\n");
        printf("\tPAGE %d",temp->index);
        printf("\n\tYOU ARE ON THE HOME PAGE\n");
        printf("\n");
        if(temp->index==0) display(0);
        if(temp->index==1) display(1);
        if(temp->index==3) display(3);
        if(temp->index==2) display(2);
        if(temp->index==4) display(4);
        if(temp->index==5) display(5);
    }
    else {
        temp = temp->back;
        printf("\n\n");
        printf("\tPAGE %d",temp->index);
        if (temp->index!=0) printf("\n\tWELCOME BACK TO %s\n",temp->data);
        printf("\n");
        if(temp->index==0) display(0);
        if(temp->index==1) display(1);
        if(temp->index==3) display(3);
        if(temp->index==2) display(2);
        if(temp->index==4) display(4);
        if(temp->index==5) display(5);
    }
    break;
```

```
case 4:
    if(temp == head) {
        printf("\n\n");
        printf("\tPAGE %d",temp->index);
        printf("\n\tALREADY ON THE HOME PAGE\n");
        printf("\n");
        if(temp->index==0) display(0);
        if(temp->index==1) display(1);
        if(temp->index==3) display(3);
        if(temp->index==2) display(2);
        if(temp->index==4) display(4);
        if(temp->index==5) display(5);
    }
    else {
        temp = head;
        printf("\n\n");
        printf("\tPAGE %d",temp->index);
        printf("\n\tWELCOME BACK TO THE HOME PAGE\n");
        printf("\n");
        if(temp->index==0) display(0);
        if(temp->index==1) display(1);
        if(temp->index==3) display(3);
        if(temp->index==2) display(2);
        if(temp->index==4) display(4);
        if(temp->index==5) display(5);
    }
    break;

case 5:
    con = false;
    break;
default:
```

```
            printf("\n");
            error();
            break;
        }

    }
        printf("\n");
        exitwebsite();
        return;
}

int main() {
    int d;
    struct node* home = (struct node*)malloc(sizeof(struct node));

    // home page
    home = createNode("\n\n\tYOU ARE ON THE HOME PAGE\n",0);

    struct node* head = home;

    // LEFT PART

    //1nd page
    head->left=createNode("SIGN-UP PAGE",1);
    head->left->back = head;
    head->left->homeWay=home;

    // 2nd page
    head->left->left = createNode("VERIFY EMAIL PAGE",3);
    head->left->left->back = head->left;
    head->left->left->homeWay = head;
```

```
    // RIGHT PART

    //3rd page
    head->right=createNode("LOGIN PAGE",2);
    head->right->back = home;
    head->back = head;
    head->right->back = head;
    head->right->homeWay = home;

    // 4th page
    head->right->left = createNode("PROFILE PAGE",4);
    head->right->left->back = head->right;
    head->right->left->homeWay = home;

    // 5th page
    head->right->right = createNode("EDIT PROFILE PAGE",5);
    head->right->right->back = head->right;
    head->right->right->homeWay = home;

    traversal(home);

    return 0;
}

void home() {
    printf("\n\t-------------------------------------------------");
    printf("\n      |                   HOME PAGE                 |");
    printf("\n      |                                             |");
    printf("\n      |                    MOODLE                   |");
    printf("\n      |             Getting started is easy         |");
    printf("\n      |                                             |");
    printf("\n      |                           SIGN UP    LOGIN |");
```

```
    printf("\n       |                                          |");
    printf("\n       | Moodle is the world's most popular learning      |");
    printf("\n       | anagement system. Start creating your online     |");
    printf("\n       | learning site in minutes!                        |");
    printf("\n       |                                          |");
    printf("\n       | Announcements:                           |");
    printf("\n       | --------------                           |");
    printf("\n       | Moodle core plugins review - Wed, Aug 25, 2021   |");
    printf("\n       | Update on Moodle 4.0 release - Fri, Aug 6, 2021  |");
    printf("\n       |                                          |");
    printf("\n       | Useful Posts          Events          Resources  |");
    printf("\n       | ------------          ------          ---------  |");
    printf("\n       |         Moodle™ is a registered trademark        |");
    printf("\n       |                                          |");
    printf("\n       |              Site Policy | Contact US             |");
    printf("\n\t-------------------------------------------------");
}

void signup() {
    printf("\n\t----------------------------");
    printf("\n       |         SIGN UP PAGE        |");
    printf("\n       |                             |");
    printf("\n       | First Name:                 |");
    printf("\n       | Last Name:                  |");
    printf("\n       | Username:                   |");
    printf("\n       | Email:                      |");
    printf("\n       | Password:                   |");
    printf("\n       |                             |");
    printf("\n       |       VERIFY YOUR EMAIL     |");
    printf("\n\t----------------------------");
}
```

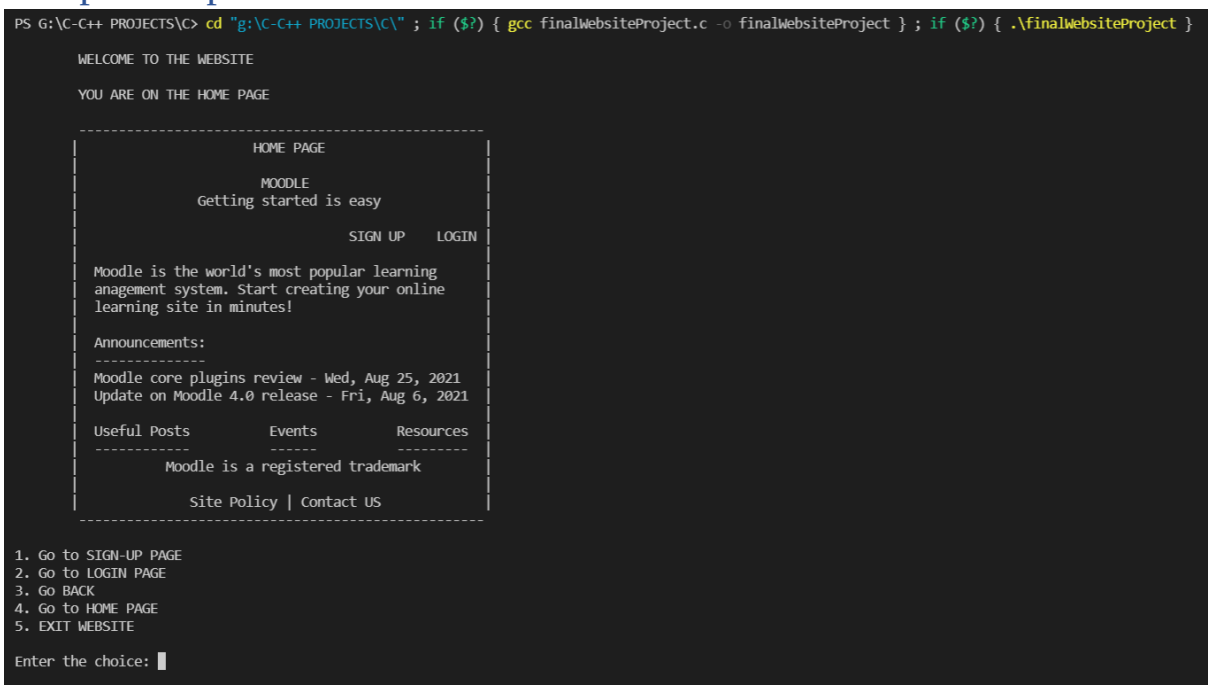
```
void verifyemail() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |                VERIFY YOUR EMAIL                |");
    printf("\n       |                                                 |");
    printf("\n       |            Thank you for signing up!            |");
    printf("\n       |    We have sent a link to your email address.   |");
    printf("\n       |  If you have not received the verification mail,  |");
    printf("\n       |    please check your Spam or Bulk Email folder.   |");
    printf("\n       |                                                 |");
    printf("\n       |           Still can't find the email?           |");
    printf("\n       |       CLICK HERE TO RESEND VERIFICATION MAIL     |");
    printf("\n\t-------------------------------------------------");
}

void login() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |                   LOGIN PAGE                    |");
    printf("\n       |                                                 |");
    printf("\n       |  Username:                                      |");
    printf("\n       |  Password:                                      |");
    printf("\n       |                                                 |");
    printf("\n       |               CLICK HERE TO LOGIN               |");
    printf("\n       |                                                 |");
    printf("\n       |             Forgot your password?               |");
    printf("\n\t-------------------------------------------------");
}

void profilepage() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |                   PROFILE PAGE                  |");
    printf("\n       |                                                 |");
    printf("\n       | YOUR RECENT COURSES:                            |");
```

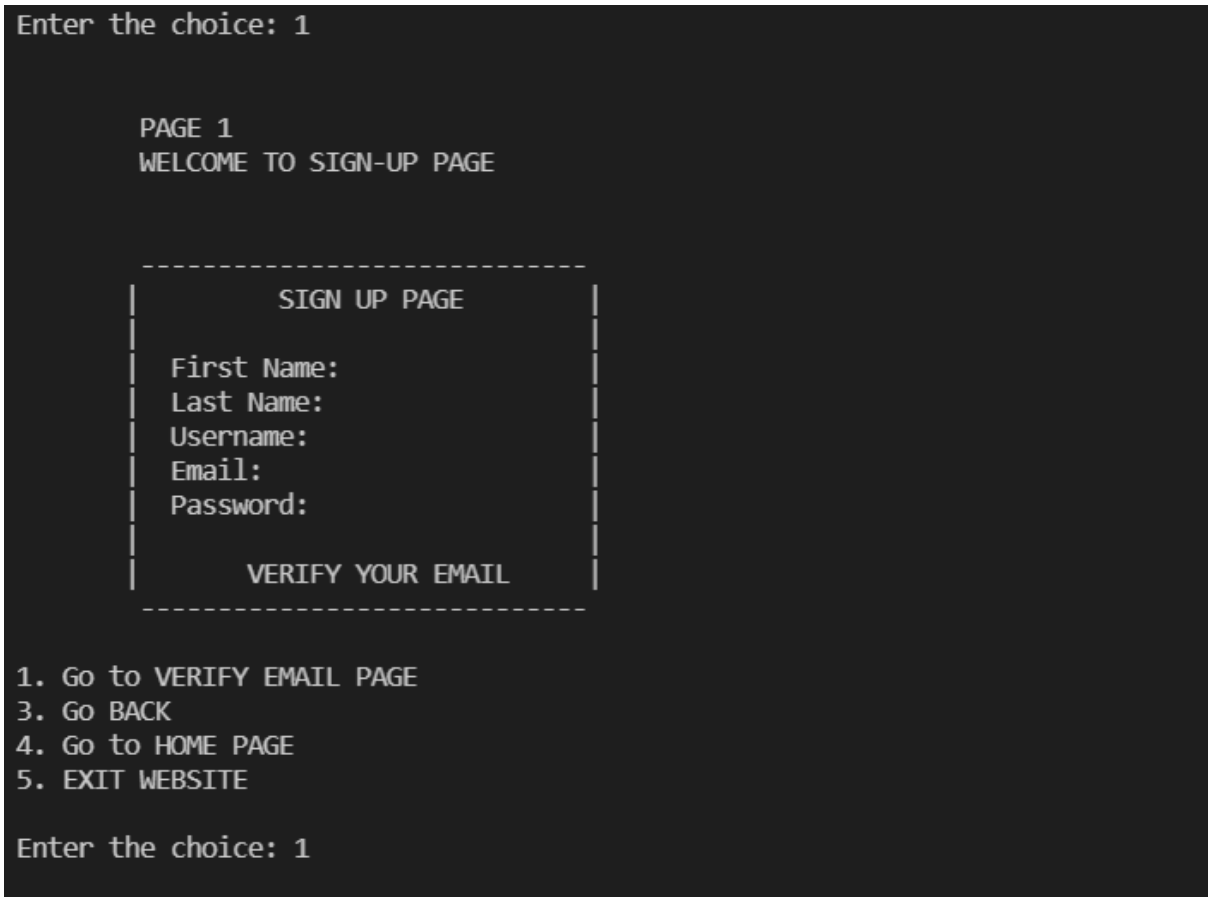
```
    printf("\n       |                                                |");
    printf("\n       | Introduction to Programming: 3 Courses Taken      |");
    printf("\n       | Data Structures and Algorithms: 1 Course Taken    |");
    printf("\n       | Probability and Statistics: 0 Courses Taken       |");
    printf("\n       |                                                |");
    printf("\n       | CLICK HERE TO ADD MORE COURSES                    |");
    printf("\n       |                                                |");
    printf("\n       | QUIZZES TAKEN: 12/15                              |");
    printf("\n       |                                                |");
    printf("\n       |                                                |");
    printf("\n       |                                                |");
    printf("\n       |                          Latest Badges: 0   |");
    printf("\n       |                          Overall Grade: A   |");
    printf("\n\t-------------------------------------------------");
}

void editprofilepage() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |              EDIT YOUR PROFILE PAGE             |");
    printf("\n       |                                                |");
    printf("\n       |  Username:                                      |");
    printf("\n       |                                                |");
    printf("\n       |  First Name:                                    |");
    printf("\n       |  Last Name:                                     |");
    printf("\n       |  Email:                                         |");
    printf("\n       |  Phone no:                                      |");
    printf("\n       |  City:                                          |");
    printf("\n       |  College:                                       |");
    printf("\n       |  Branch:                                        |");
    printf("\n       |                                                |");
    printf("\n       |  Password:                                      |");
    printf("\n       |  New Password:                                  |");
```

```
    printf("\n       |  Confirm New Password:                          |");
    printf("\n       |                                                 |");
    printf("\n       |            CLICK HERE TO UPDATE PROFILE         |");
    printf("\n\t-------------------------------------------------");
}

void error() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |                                                 |");
    printf("\n       |  MOODLE                                         |");
    printf("\n       |                                                 |");
    printf("\n       |  404. That's an error.                          |");
    printf("\n       |  The requested URL was not found in this server.  |");
    printf("\n       |                                                 |");
    printf("\n       |                                                 |");
    printf("\n       |                                                 |");
    printf("\n       |  PLEASE ENTER VALID CHOICE                      |");
    printf("\n\t-------------------------------------------------");
}

void exitwebsite() {
    printf("\n\t-------------------------------------------------");
    printf("\n       |  MOODLE                                         |");
    printf("\n       |                                                 |");
    printf("\n       |  You have successfully exited out of the website. |");
    printf("\n       |                                                 |");
    printf("\n       |                                                 |");
    printf("\n       |                                                 |");
    printf("\n       |  To log back in, kindly run the program again.    |");
    printf("\n       |                                                 |");
    printf("\n       |                        2021 - Moodle - Privacy |");
    printf("\n\t-------------------------------------------------");
```

}

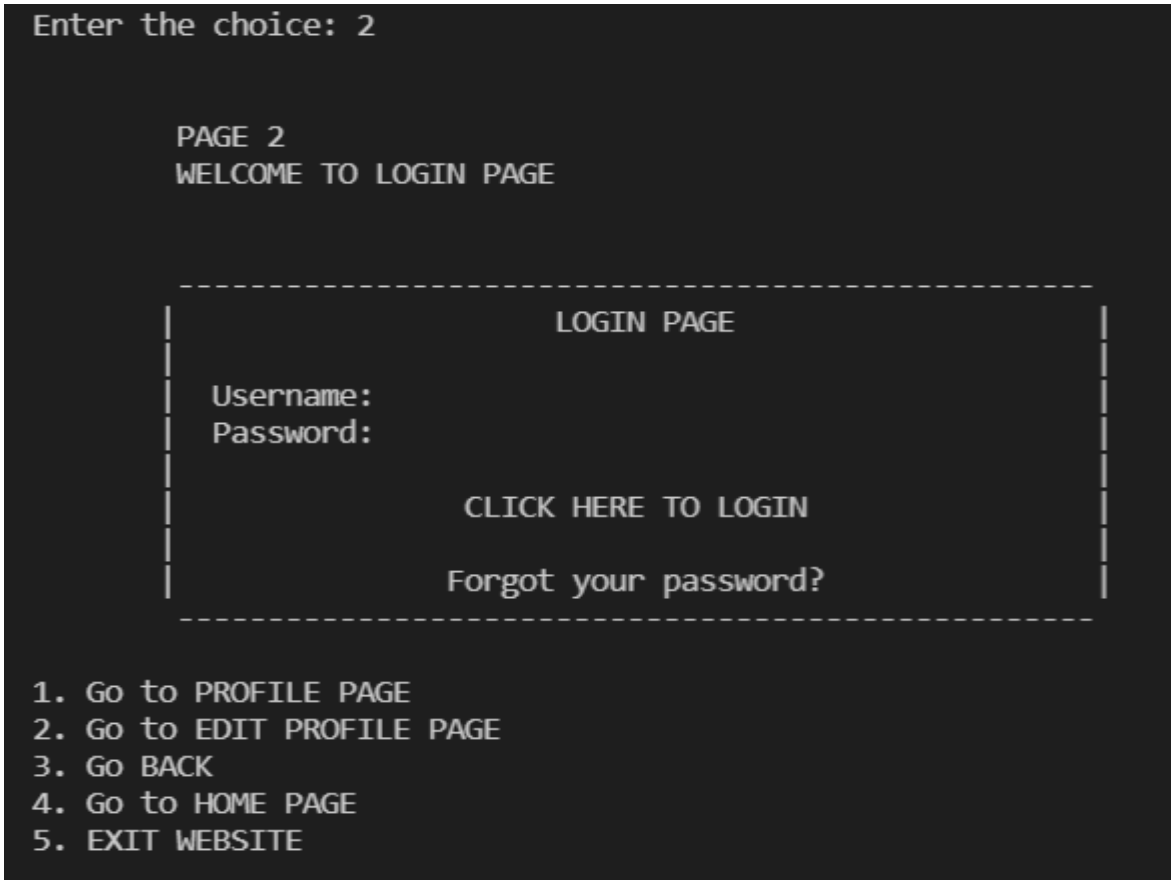
Sample Outputs





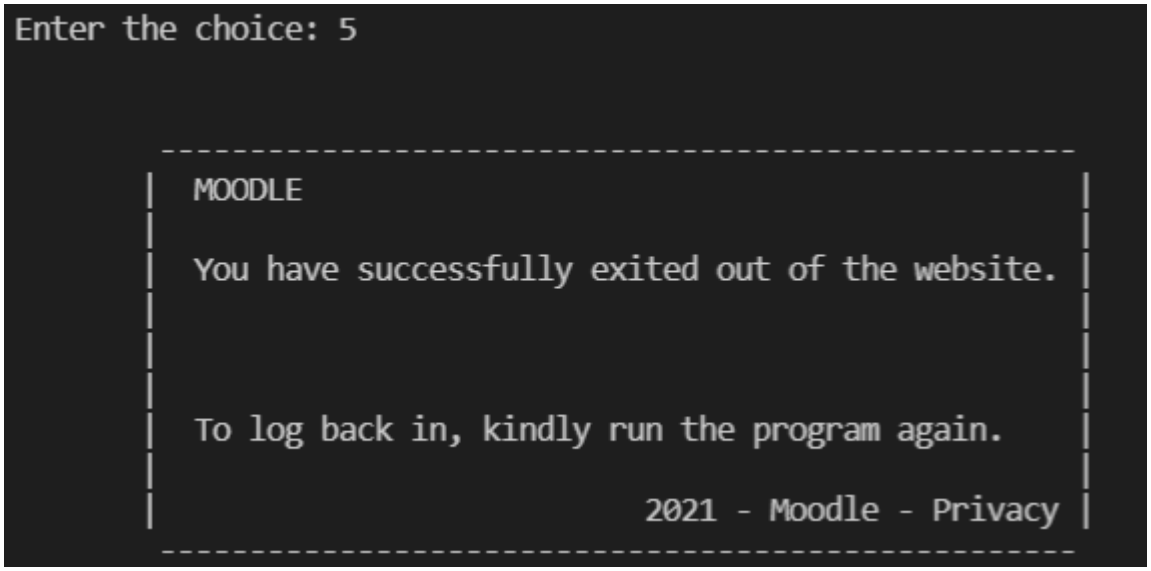
```
Enter the choice: 1


        PAGE 3
        WELCOME TO VERIFY EMAIL PAGE


        ---------------------------------------------------
       |                  VERIFY YOUR EMAIL                |
       |                                                   |
       |              Thank you for signing up!            |
       |    We have sent a link to your email address.     |
       |  If you have not received the verification mail,  |
       |    please check your Spam or Bulk Email folder.   |
       |                                                   |
       |            Still can't find the email?            |
       |        CLICK HERE TO RESEND VERIFICATION MAIL     |
        ---------------------------------------------------

        *THIS IS END OF THE PAGE*


3. Go BACK
4. Go to HOME PAGE
5. EXIT WEBSITE
```

```
Enter the choice: 4


        PAGE 0
        WELCOME BACK TO THE HOME PAGE


        ------------------------------------------------
       |                      HOME PAGE                 |
       |                                                |
       |                      MOODLE                    |
       |               Getting started is easy          |
       |                                                |
       |                                SIGN UP   LOGIN |
       |                                                |
       |  Moodle is the world's most popular learning   |
       |  anagement system. Start creating your online  |
       |  learning site in minutes!                     |
       |                                                |
       |  Announcements:                                |
       |  --------------                                |
       |  Moodle core plugins review - Wed, Aug 25, 2021|
       |  Update on Moodle 4.0 release - Fri, Aug 6, 2021|
       |                                                |
       |  Useful Posts          Events          Resources|
       |  ------------          ------          ---------|
       |          Moodle is a registered trademark      |
       |                                                |
       |             Site Policy | Contact US          |
        ------------------------------------------------

1. Go to SIGN-UP PAGE
2. Go to LOGIN PAGE
3. Go BACK
4. Go to HOME PAGE
5. EXIT WEBSITE

Enter the choice:
```


Enter the choice: 2
PAGE 2
WELCOME TO LOGIN PAGE
LOGIN PAGE
Username:
Password:
CLICK HERE TO LOGIN
Forgot your password?
1. Go to PROFILE PAGE
2. Go to EDIT PROFILE PAGE
3. Go BACK
4. Go to HOME PAGE
5. EXIT WEBSITE

```
Enter the choice: 1


        PAGE 4
        WELCOME TO PROFILE PAGE


        ------------------------------------------------
       |                    PROFILE PAGE                |
       |                                                |
       | YOUR RECENT COURSES:                           |
       |                                                |
       | Introduction to Programming: 3 Courses Taken   |
       | Data Structures and Algorithms: 1 Course Taken |
       | Probability and Statistics: 0 Courses Taken    |
       |                                                |
       | CLICK HERE TO ADD MORE COURSES                 |
       |                                                |
       | QUIZZES TAKEN: 12/15                           |
       |                                                |
       |                                                |
       |                                                |
       |                                Latest Badges: 0|
       |                                Overall Grade: A|
        ------------------------------------------------

        *THIS IS END OF THE PAGE*


3. Go BACK
4. Go to HOME PAGE
5. EXIT WEBSITE
```

```
Enter the choice: 2


        PAGE 5
        WELCOME TO EDIT PROFILE PAGE


        ------------------------------------------------------
       |                EDIT YOUR PROFILE PAGE                |
       |                                                      |
       |  Username:                                           |
       |                                                      |
       |  First Name:                                         |
       |  Last Name:                                          |
       |  Email:                                              |
       |  Phone no:                                           |
       |  City:                                               |
       |  College:                                            |
       |  Branch:                                             |
       |                                                      |
       |  Password:                                           |
       |  New Password:                                       |
       |  Confirm New Password:                               |
       |                                                      |
       |             CLICK HERE TO UPDATE PROFILE             |
        ------------------------------------------------------

        *THIS IS END OF THE PAGE*


3. Go BACK
4. Go to HOME PAGE
5. EXIT WEBSITE
```



Contribution by group members

B120055: SASWAT SAMAL CODE, LOGIC, AND DESIGNING PART

B120056: SAUMYA PANDA CODE, LOGIC, AND DESIGNING PART

References

(Geeks For Geeks): I) https://www.geeksforgeeks.org/data-structures/linked-list

II) https://www.geeksforgeeks.org/graph-data-structure-and-algorithms/

(Java Point): I) https://www.javatpoint.com/ds-graph

II) https://www.javatpoint.com/ds-linked-list