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1)

```cpp
#include <bits/stdc++.h>
using namespace std;
typedef long long ll;

int main()
{
    ll n1 = 0b10111001;
    ll n2 = 0b10010110;
    cout << "Decimal = " << (n1 & n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 & n2) << "\n";

    n1 = 0b11011110;
    n2 = 0b11000101;
    cout << "Decimal = " << (n1 & n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 & n2) << "\n";

    n1 = 0b01111101;
    n2 = 0b10111110;
    cout << "Decimal = " << (n1 | n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 | n2) << "\n";

    n1 = 0b11000110;
    n2 = 0b11011100;
    cout << "Decimal = " << (n1 | n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 | n2) << "\n";

    n1 = 0b10111001;
    n2 = 0b11110110;
    cout << "Decimal = " << (n1 ^ n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 ^ n2) << "\n";

    n1 = 0b11000010;
    n2 = 0b00000101;
    cout << "Decimal = " << (n1 ^ n2) << "\n";
    cout << "Binary  = " << bitset<8>(n1 ^ n2) << "\n";

    n1 = 0b1011100110010110;
    cout << "Binary  = " << bitset<16>(~n1) << "\n";

    n1 = 11011110;
    n2 = 11000101;
    cout << "Binary  = " << bitset<8>(~n1 & n2) << "\n";
```

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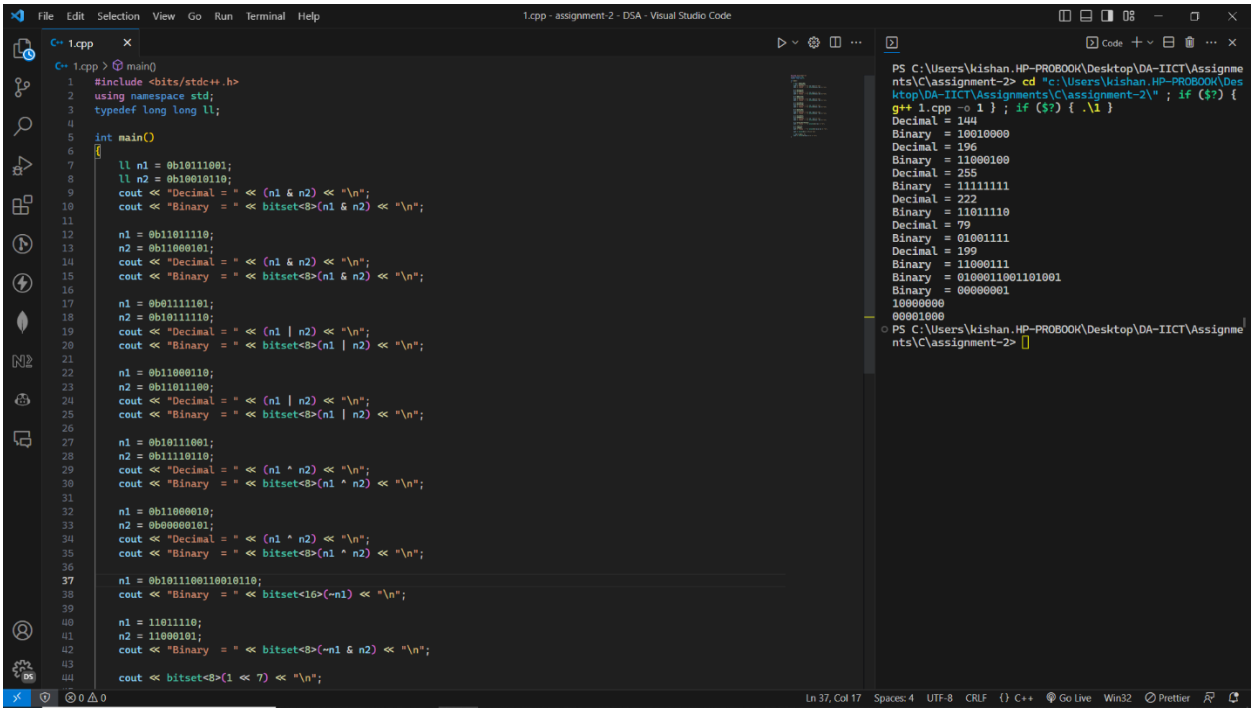
```
    cout << bitset<8>(1 << 7) << "\n";

    ll num = pow(2, 7);
    cout << bitset<8>(num >> 4) << "\n";
}
```



2)

```
#include <bits/stdc++.h>
using namespace std;
typedef long long ll;

int main()
{
    ll bit = 0b10101110101010110101110100111011;

    cout << "1)\n";
    // set 16th bit
    bitset<32> result(bit | (1 << 15));
    cout << result << "\n";

    cout << "2)\n";
    // set 28th bit
    result = bitset<32>(bit & ~(1 << 27));
```

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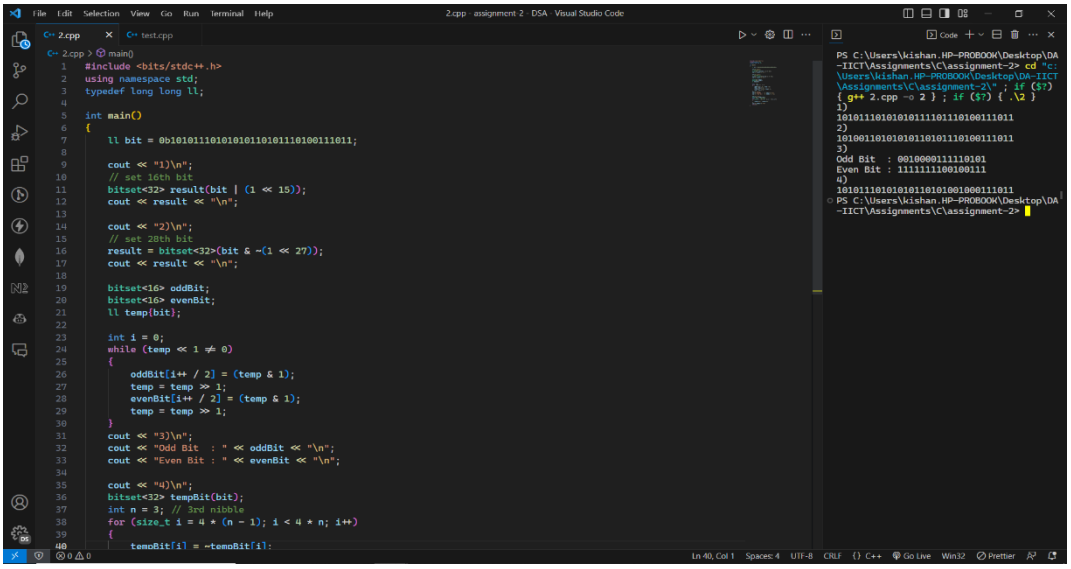
```
    cout << result << "\n";

    bitset<16> oddBit;
    bitset<16> evenBit;
    ll temp{bit};

    int i = 0;
    while (temp << 1 != 0)
    {
        oddBit[i++ / 2] = (temp & 1);
        temp = temp >> 1;
        evenBit[i++ / 2] = (temp & 1);
        temp = temp >> 1;
    }
    cout << "3)\n";
    cout << "Odd Bit  : " << oddBit << "\n";
    cout << "Even Bit : " << evenBit << "\n";

    cout << "4)\n";
    bitset<32> tempBit(bit);
    int n = 3; // 3rd nibble
    for (size_t i = 4 * (n - 1); i < 4 * n; i++)
    {
        tempBit[i] = ~tempBit[i];
    }
    cout << tempBit << "\n";
    return 0;
}
```



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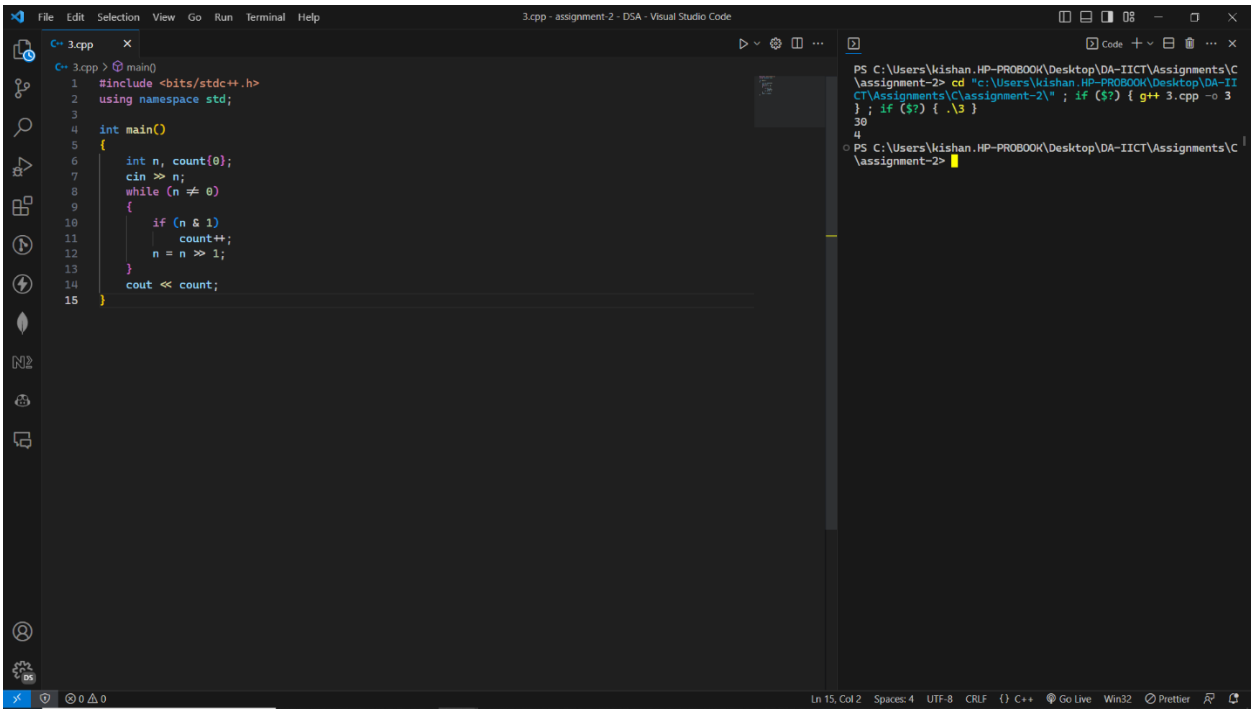
3)

```cpp
#include <bits/stdc++.h>
using namespace std;

int main()
{
    int n, count{0};
    cin >> n;
    while (n != 0)
    {
        if (n & 1)
            count++;
        n = n >> 1;
    }
    cout << count;
}
```



4)

```cpp
#include <bits/stdc++.h>
using namespace std;

// 0 - Tablet Mode
```

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```
// 1 - WiFi
// 2 - Mute
// 3 - Airplane Mode
// 4 - Auto Hide Taskbar

const vector<string> settingNames = {
    "Tablet Mode",
    "WiFi",
    "Mute",
    "Airplane Mode",
    "Auto Hide Taskbar"};

void display(bitset<5> &settings)
{
    cout << "\n================================\n";
    for (size_t i = 0; i < settings.size(); i++)
    {
        if (settings[i])
        {
            cout << settingNames[i];
            cout << " is *ON*\n";
        }
        else
        {
            cout << settingNames[i];
            cout << " is OFF\n";
        }
    }
    cout << "================================\n";
}

void takeInput(bitset<5> &settings)
{
    cout << "\n=>Select option to toggle<=\n";
    for (size_t i = 0; i < settingNames.size(); i++)
    {
        cout << i + 1 << ") " << settingNames[i] << "\n";
    }
    int input;
    cin >> input;

    if (input >= 1 && input <= 5)
    {
        settings[input - 1] = ~settings[input - 1];
    }
```

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```
    else
    {
        cout << "Invalid input\n";
    }
    display(settings);
}

int main()
{
    bitset<5> settings(00000);
    int input;
    bool isExist = false;
    display(settings);
    while (1)
    {
        if (isExist)
            break;

        cout << "Select one of the option...\n";
        cout << "1) Display the settings\n";
        cout << "2) Change the settings\n";
        cout << "3) EXIT\n";
        cin >> input;

        switch (input)
        {
        case 1:
            display(settings);
            break;

        case 2:
            takeInput(settings);
            break;

        case 3:
            isExist = true;
            break;

        default:
            cout << "Please provide valid response\n";
            break;
        }
    }
}
```

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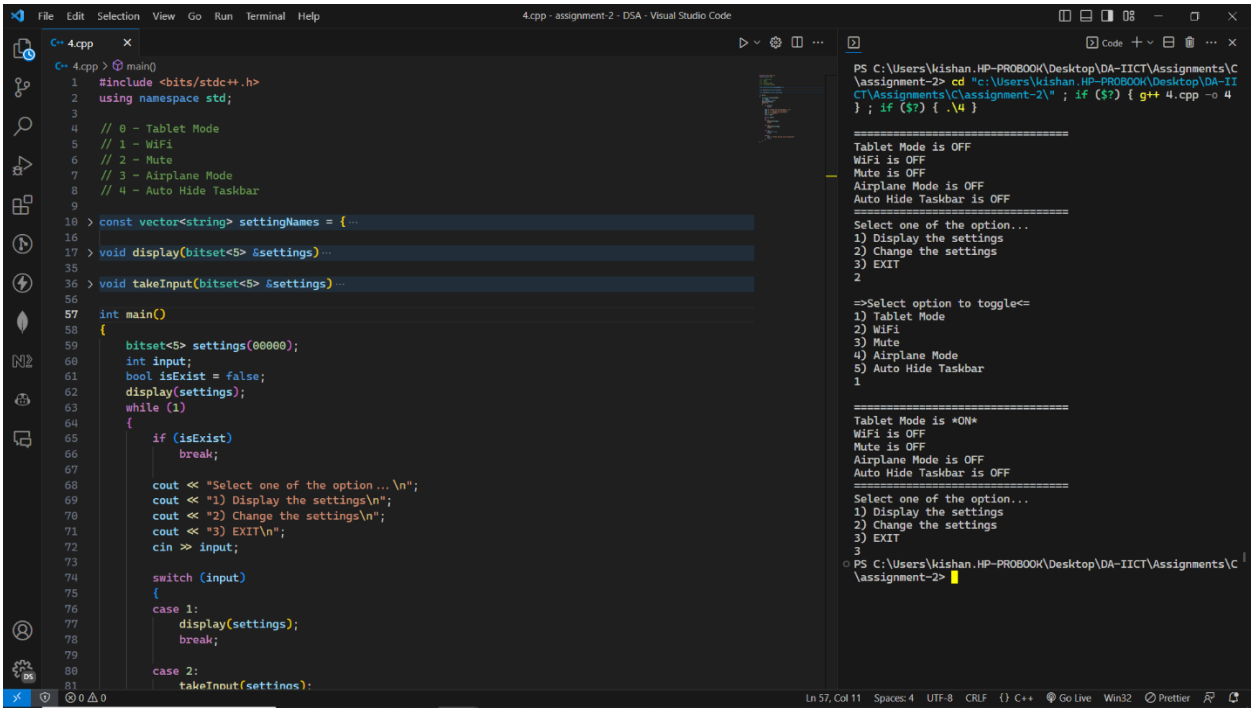

5)

```cpp
#include <iostream>
using namespace std;
typedef unsigned int uint;
void print(int num)
{
    cout << "\nValues Selected : \n\n";
    int temp = 0;
    while (temp < 12)
    {
        if ((temp + 1) == 1)
        {
            if (num & 1)
                cout << "Seat Covers";
        }
        else if ((temp + 1) == 2)
        {
            if (num & 1)
                cout << " : Beige ";
        }
        else if ((temp + 1) == 3)
        {
            if (num & 1)
                cout << " : Dark ";
```

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```
        }
        else if ((temp + 1) == 4)
        {
            if (num & 1)
                cout << " : Dual Pattern ";
        }
        else if ((temp + 1) == 5)
        {
            if (num & 1)
                cout << "\n"
                     << "Alloys";
        }
        else if ((temp + 1) == 6)
        {
            if (num & 1)
                cout << "\n"
                     << "Colors ";
        }
        else if ((temp + 1) == 7)
        {
            if (num & 1)
                cout << " : Coffee Brown ";
        }
        else if ((temp + 1) == 8)
        {
            if (num & 1)
                cout << " : Pearl White";
        }
        else if ((temp + 1) == 9)
        {
            if (num & 1)
                cout << " : Marine Blue ";
        }
        else if ((temp + 1) == 10)
        {
            if (num & 1)
                cout << " : Ash Grey ";
        }
        else if ((temp + 1) == 11)
        {
            if (num & 1)
                cout << "\n"
                     << "Steering Cover";
        }
        else if ((temp + 1) == 12)
```

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```
        {
            if (num & 1)
                cout << "\n"
                     << "Body Cover"
                     << "\n";
        }
        num = num >> 1;
        temp++;
    }
    cout << "\n\n";
}
void CarCompany()
{
    unsigned int num{0b0}, bcv = {0b1};
    bool select = 0;
    int ch;
    cout << "\n--- Welcome To Car Company---\n\n";
    cout << "Select for \"Seat Cover\" (0 for no / 1 for yes): ";
    cin >> select;
    if (select == 1)
    {
        num = num | bcv;
        cout << "\nSelect for Seat cover :- \n";
        cout << " 1) Beige\n";
        cout << " 2) Dark\n";
        cout << " 3) Dual Pattern\n";
        cout << "Enter Choice : ";
        cin >> ch;
        switch (ch)
        {
        case 1:
            num = num | bcv << 1;
            break;
        case 2:
            num = num | bcv << 2;
            break;
        case 3:
            num = num | bcv << 3;
            break;
        default:
            break;
        }
    }
    cout << "\nDo you want \"Alloys\" (0 for no / 1 for yes): ";
    cin >> select;
```

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```
    if (select == 1)
    {
        num = num | bcv << 4;
    }
    cout << "\nDo you want to Select for \"Colors\" (0 for no / 1 for yes):
";
    cin >> select;
    if (select == 1)
    {
        num = num | bcv << 5;
        cout << "\nSelect for Colors : \n";
        cout << " 1) Coffee Brown\n";
        cout << " 2) Pearl White\n";
        cout << " 3) Marine Blue\n";
        cout << " 4) Ash Grey\n";
        cout << "Enter Choice : ";
        cin >> ch;
        switch (ch)
        {
        case 1:
            num = num | bcv << 6;
            break;
        case 2:
            num = num | bcv << 7;
            break;
        case 3:
            num = num | bcv << 8;
            break;
        case 4:
            num = num | bcv << 9;
            break;
        default:
            break;
        }
    }
    cout << "\nDo you want \"Steering Cover\" (0 for no / 1 for yes): ";
    cin >> select;
    if (select == 1)
    {
        num = num | bcv << 10;
    }
    cout << "\nDo you want \"Body Cover\" (0 for no / 1 for yes): ";
    cin >> select;
    if (select == 1)
    {
```

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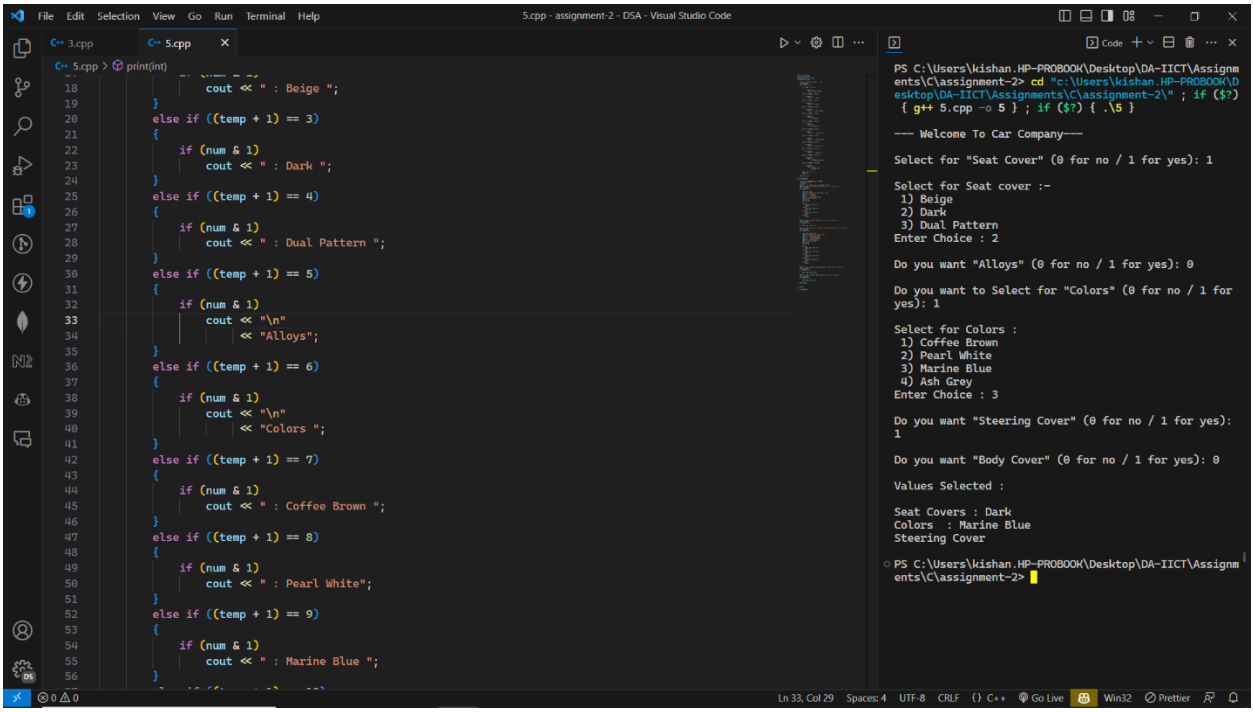
```
        num = num | bcv << 11;
    }
    print(num);
}

int main()
{
    CarCompany();
}
```



6)

```
#include <bits/stdc++.h>
using namespace std;

int main()
{
    double arr[5];
    double value = 1.1;

    for (size_t i = 0; i < 5; i++)
    {
        arr[i] = value;
        // cout << value << "\n";
```

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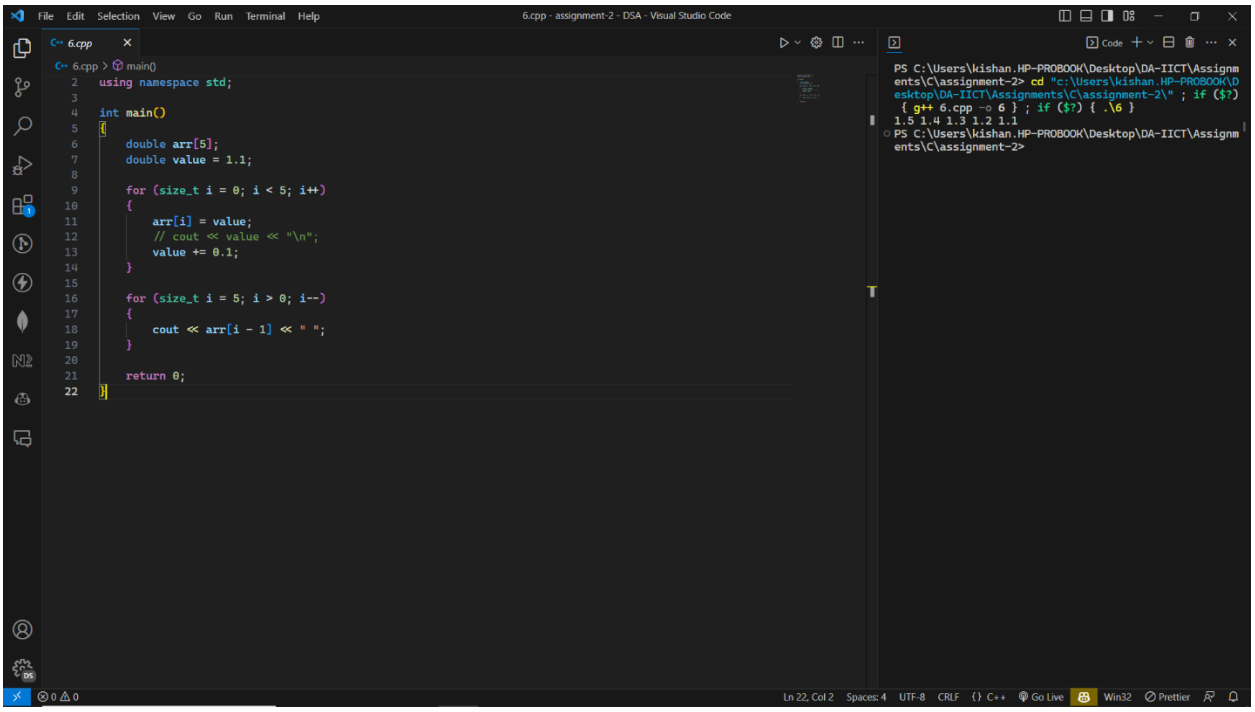
```
        value += 0.1;
    }

    for (size_t i = 5; i > 0; i--)
    {
        cout << arr[i - 1] << " ";
    }

    return 0;
}
```



7)

```
#include <iostream>
#include <cstring>
#include <string.h>
#include <cctype>

using namespace std;

int main()
{
    char chArrayA[100]{""}, chArrayB[100]{""};
```

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```
    // a
    cin >> chArrayA >> chArrayB;
    cout << "a) \n";
    cout << "Firstname:- " << chArrayA << "\n"
         << "Lastname :- " << chArrayB << "\n";

    // b
    strcat(chArrayA, " ");
    strcat(chArrayA, chArrayB);
    cout << "b) \n";
    cout << chArrayA << "\n";

    // c
    cin.ignore();
    cin.getline(chArrayA, 90);
    cout << "c) \n";
    cout << chArrayA << "\n";

    // d
    int lastLocA = strlen(chArrayA) - 1;
    int lastLocB = 0;
    for (int i = lastLocA; i > 0; i--)
    {
        chArrayB[lastLocB++] = chArrayA[i];
    }
    cout << "d) \n";
    cout << chArrayB << "\n";

    // e
    char temp[100][100];
    int row{0}, col{0};
    temp[0][col++] = ' ';

    for (size_t i = 0; i < strlen(chArrayA); i++)
    {
        if (chArrayA[i] == ' ')
        {
            row++;
            col = 0;
        }
        temp[row][col++] = chArrayA[i];
    }

    lastLocB = 0;
    for (size_t I = row + 1; I > 0; I--)
```

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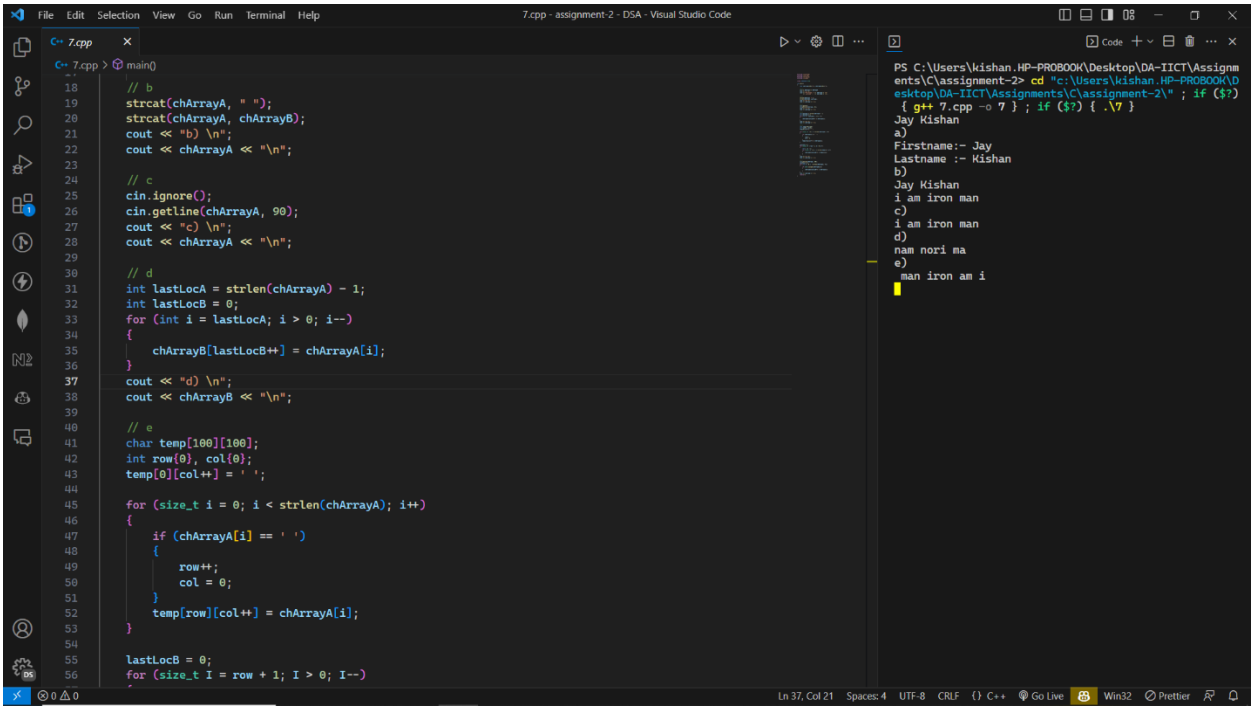
```
    {
        int i = I - 1;
        for (size_t j = 0; j < strlen(temp[i]); j++)
        {
            chArrayB[lastLocB++] = temp[i][j];
        }
    }
    cout << "e) \n";
    cout << chArrayB << "\n";

    // f
    cin.getline(chArrayA, 100);
    lastLocB = 0;
    for (int i = 0; i < strlen(chArrayA); ++i)
    {
        if (std::isalpha(chArrayA[i]))
        {
            chArrayB[lastLocB++] = chArrayA[i];
        }
    }
    cout << chArrayB << "\n";
    return 0;
}
```



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8)

```
#include <iostream>
#include <bitset>
using namespace std;

int seats[16];
const int totalRow = 16;
const int totalSeatInRow = 20;
const char seatBooked{'X'};
const char seatAvailale{'.'};

void setInitialData()
{
    for (size_t i = 0; i < totalRow; i++)
    {
        seats[i] = 0;
    }
}

void display()
{
    char rowName = 'A';
    for (size_t i = 0; i < totalRow; i++)
    {
        bitset<20> row(seats[i]);
        for (size_t i = 0; i < row.size(); i++)
        {
            if (row[i] == 1)
            {
                cout << seatBooked;
            }
            else
            {
                cout << seatAvailale;
            }
        }
        cout << "   <=== " << rowName++;
        cout << "\n";
    }
    cout << "VVVVVVVVVVVVVVVVVVV   Screeen this way\n";
}

void buyTicket()
{
```

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```
    char rowName{};
    int row{0}, col{0};
    cout << "Enter row:- ";
    cin >> rowName;
    cout << "Enter seat number:- ";
    cin >> col;
    row = (rowName >= 'A' && rowName <= 'P') ? (rowName - 'A') : ((rowName
>= 'a' && rowName <= 'p') ? (rowName - 'a') : -1);

    if (row != -1)
    {
        if (col > 0 && col <= totalSeatInRow)
        {
            bitset<20> temp = bitset<20>(seats[row]);
            if (temp[col - 1] == 0)
            {
                temp[col - 1] = 1;
                seats[row] = static_cast<int>(temp.to_ulong());
                cout << rowName << "-" << col << " has been booked
successfully.\n";
            }
            else
            {
                cout << "Sorry, this seat is already booked.\n";
            }
        }
        else
        {
            cout << "Seat number you entered is not valid.\n";
        }
    }
    else
    {
        cout << "Please enter vaild seat name.\n";
    }
}

void cancelTicket()
{
    char rowName{};
    int row{0}, col{0};
    cout << "Enter row:- ";
    cin >> rowName;
    cout << "Enter seat number:- ";
    cin >> col;
```

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```
    row = (rowName >= 'A' && rowName <= 'P') ? (rowName - 'A') : ((rowName
>= 'a' && rowName <= 'p') ? (rowName - 'a') : -1);

    if (row != -1)
    {
        if (col > 0 && col <= totalSeatInRow)
        {
            bitset<20> temp = bitset<20>(seats[row]);
            if (temp[col - 1] == 1)
            {
                temp[col - 1] = 0;
                seats[row] = static_cast<int>(temp.to_ulong());
                cout << "Your ticket " << rowName << "-" << col << " has
been cancelled successfully.\n";
            }
            else
            {
                cout << "Please recheck again, this seat is not booked.\n";
            }
        }
        else
        {
            cout << "Seat number you entered is not valid.\n";
        }
    }
    else
    {
        cout << "Please enter vaild row name.\n";
    }
}

int main()
{
    int choice{0};
    display();
    bool exit = false;
    while (1)
    {
        if (exit)
            break;

        cout << "1) Buy a ticket \n2) Cancel a ticket \n3) Exit";
        cin >> choice;

        switch (choice)
```

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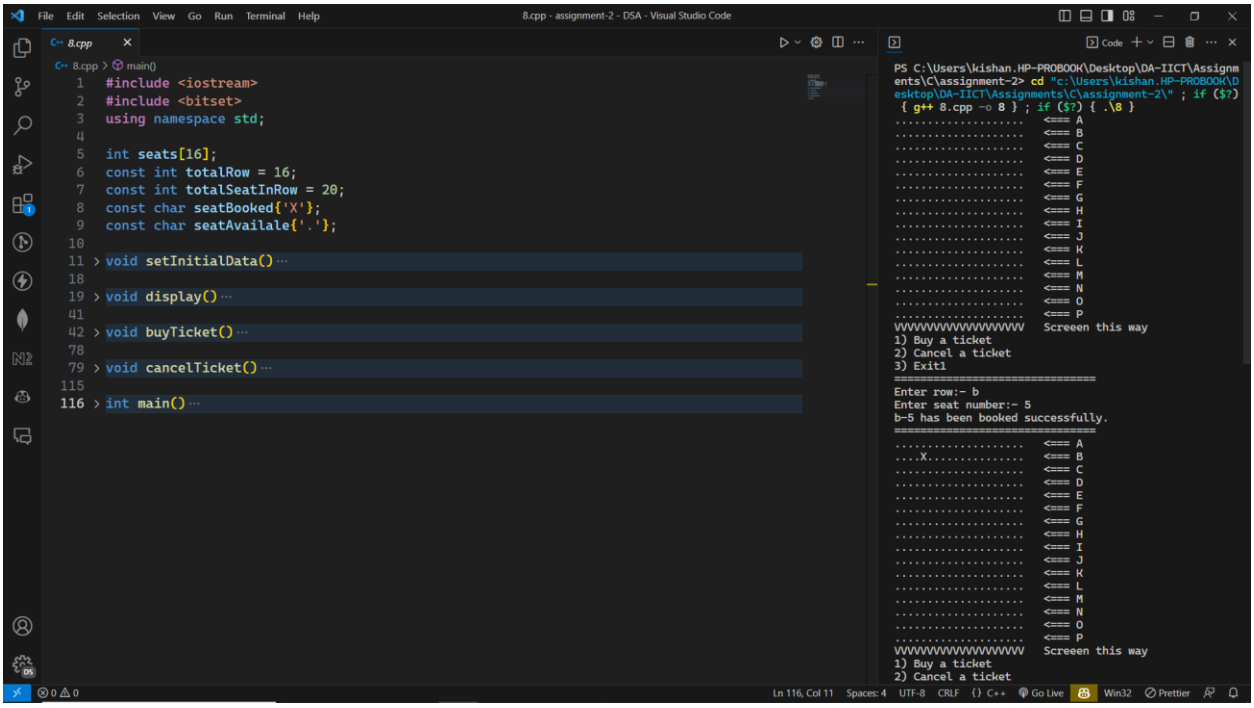
```
        {
        case 1:
            cout << "================================\n";
            buyTicket();
            cout << "================================\n";
            display();
            break;

        case 2:
            cout << "================================\n";
            cancelTicket();
            cout << "================================\n";
            display();
            break;

        case 3:
            exit = true;
            break;

        default:
            cout << "Please enter valid choice\n";
            break;
        }
    }
}
```



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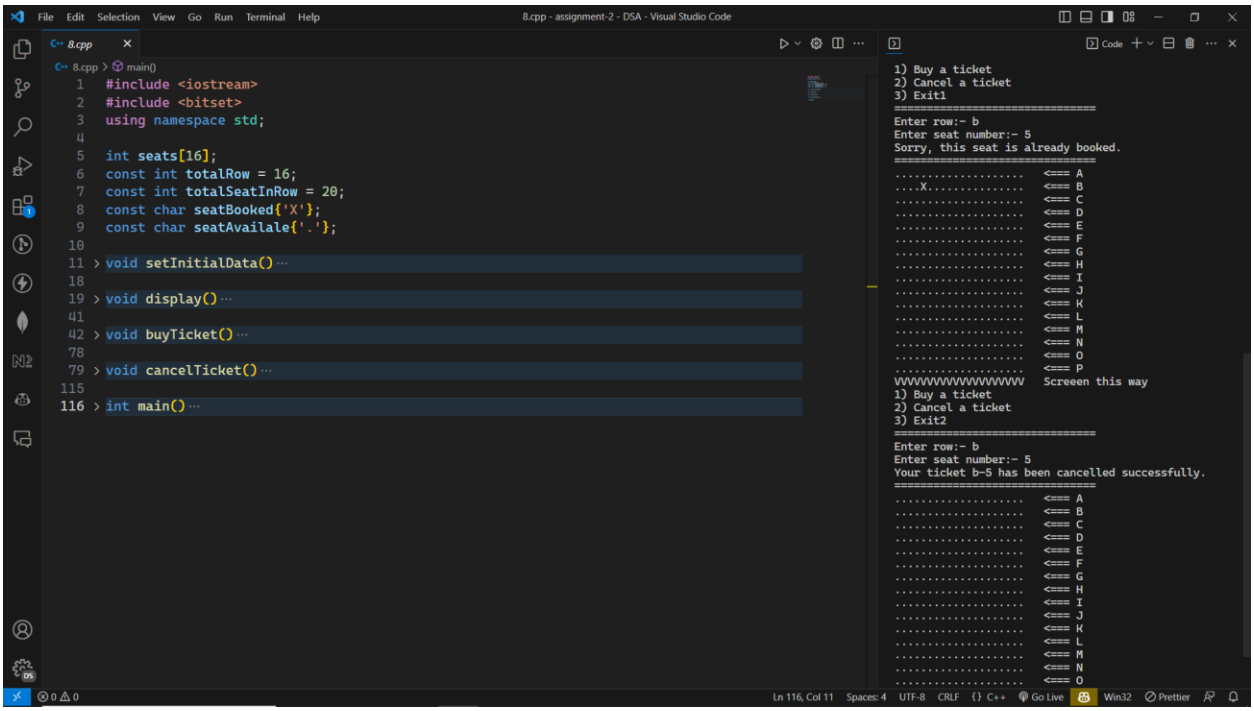

9)

```cpp
#include <bits/stdc++.h>
using namespace std;

vector<int> pendingOrders;

void placeOrder()
{
    int orderNumber = 1 + pendingOrders.size();
    pendingOrders.push_back(orderNumber);
    cout << "==================================\n";
    cout << "Your order is placed. Order Number:- " << orderNumber << "\n";
    cout << "==================================\n";
    cin.ignore();
}

void displayPendingOrders()
{
    cout << "==================================\n";
    cout << "Pending orders:- "
         << "\n";
    for (int orderNumber : pendingOrders)
    {
        cout << "=> Order Number: " << orderNumber << "\n";
    }
    cout << "Total pending orders:- " << pendingOrders.size() << "\n";
```

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```
    cout << "================================\n";
}

void serveOrder()
{
    cout << "================================\n";
    cout << "Pending orders:\n";
    for (int orderNumber : pendingOrders)
    {
        cout << "=> Order Number: " << orderNumber << "\n";
    }

    cout << "\nPick order: ";
    int pickedOrder;
    cin >> pickedOrder;

    auto it = find(pendingOrders.begin(), pendingOrders.end(), pickedOrder);
    if (it != pendingOrders.end())
    {
        pendingOrders.erase(it);
        cout << "Order " << pickedOrder << " has been served.\n";
    }
    else
    {
        cout << "Invalid order number.\n";
    }
    cin.ignore();
    cout << "================================\n";
}

int main()
{
    int choice{0};
    bool exit = false;
    while (1)
    {
        if (exit)
            break;

        cout << "1) Place order\n2) Pending orders\n3) Serve order\n4) Exit\nEnter
your pick: ";
        cin >> choice;

        switch (choice)
        {
        case 1:
            placeOrder();
            break;

        case 2:
```

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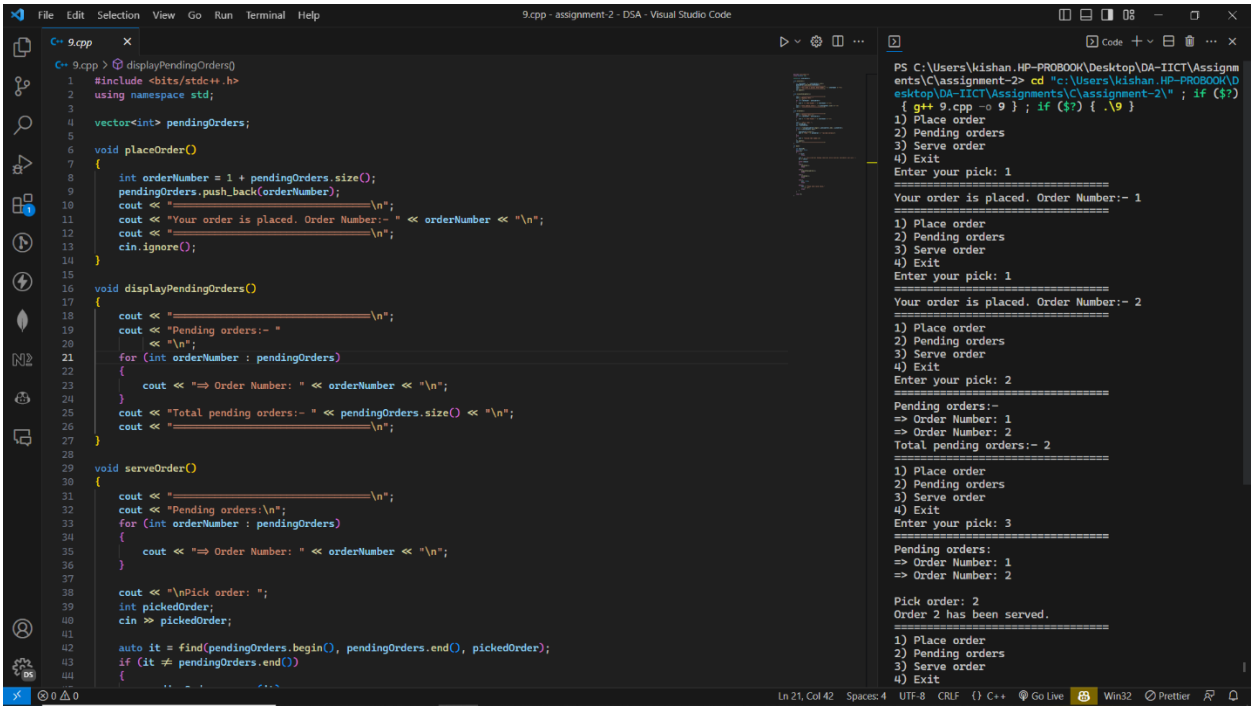
```
            displayPendingOrders();
            break;

        case 3:
            serveOrder();
            break;

        case 4:
            exit = true;
            break;

        default:
            cout << "Please enter valid choice."
                 << "\n";
            break;
        }
    }

    return 0;
}
```



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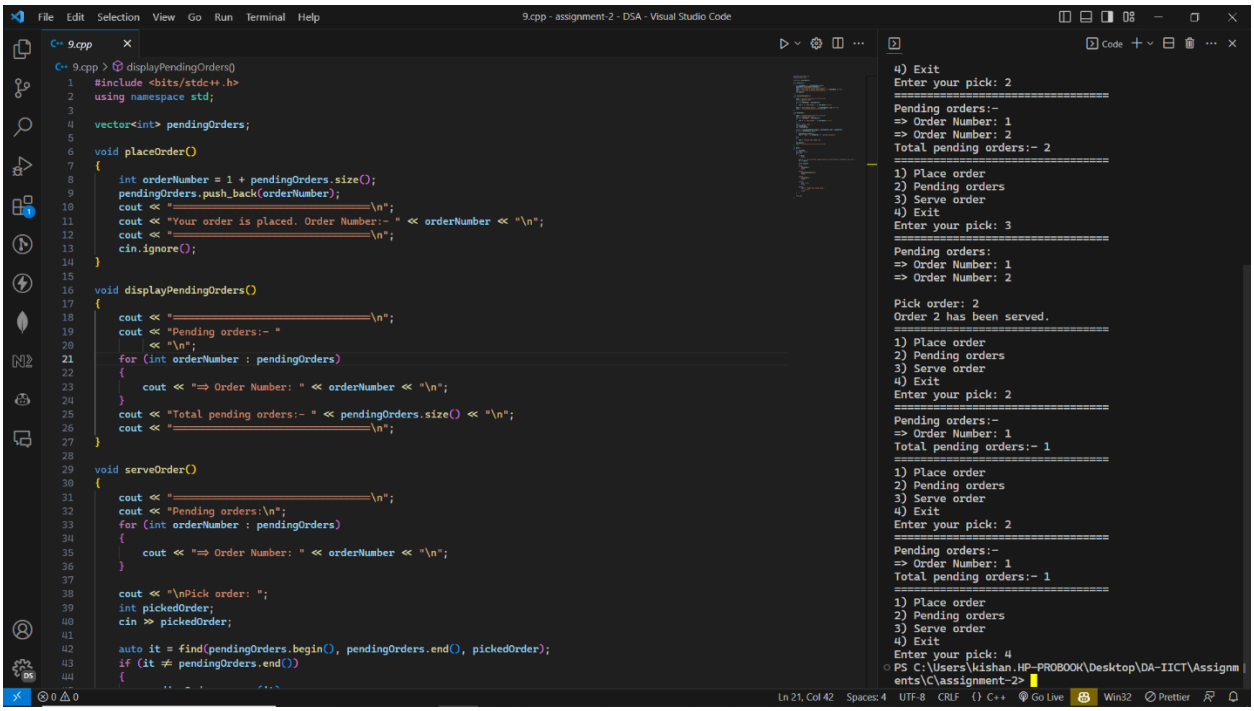

10)

```
#include <bits/stdc++.h>
using namespace std;
#define MAX 1000

int main()
{
    int row, col;

    cin >> row >> col;
    char arr[MAX][MAX] = {0};
    bool flg = 0;
    for (int i = 0; i < row; i++)
    {
        for (int j = 0; j < col; j++)
        {
            arr[i][j] = '*';
        }
    }
    int round = 0;
    row--, col--;
    while (1)
    {
        int col_limit = col - (round + 1), row_limit = row - (round + 1);
        int x1 = round, y1 = round, x2 = round, y2 = col - round, x3 = row - round,
y3 = round, x4 = row - round, y4 = col - round;
```

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```
        if (y1 > y2 || y3 > y4 || x1 > x3 || x2 > x4)
            break;
        while (y1 <= col_limit)
            arr[x1][y1++] = arr[x4][y4--] = '-';
        while (x2 <= row_limit)
            arr[x2++][y2] = arr[x3--][y3] = '-';
        round += 2;
    }
    if (row == col && (row % 4) == 0)
    {
        arr[row / 2][col / 2] = '-';
    }
    for (int i = 0; i < row + 1; i++)
    {
        for (int j = 0; j < col + 1; j++)
        {
            cout << arr[i][j] << " ";
        }
        cout << endl;
    }
}
```