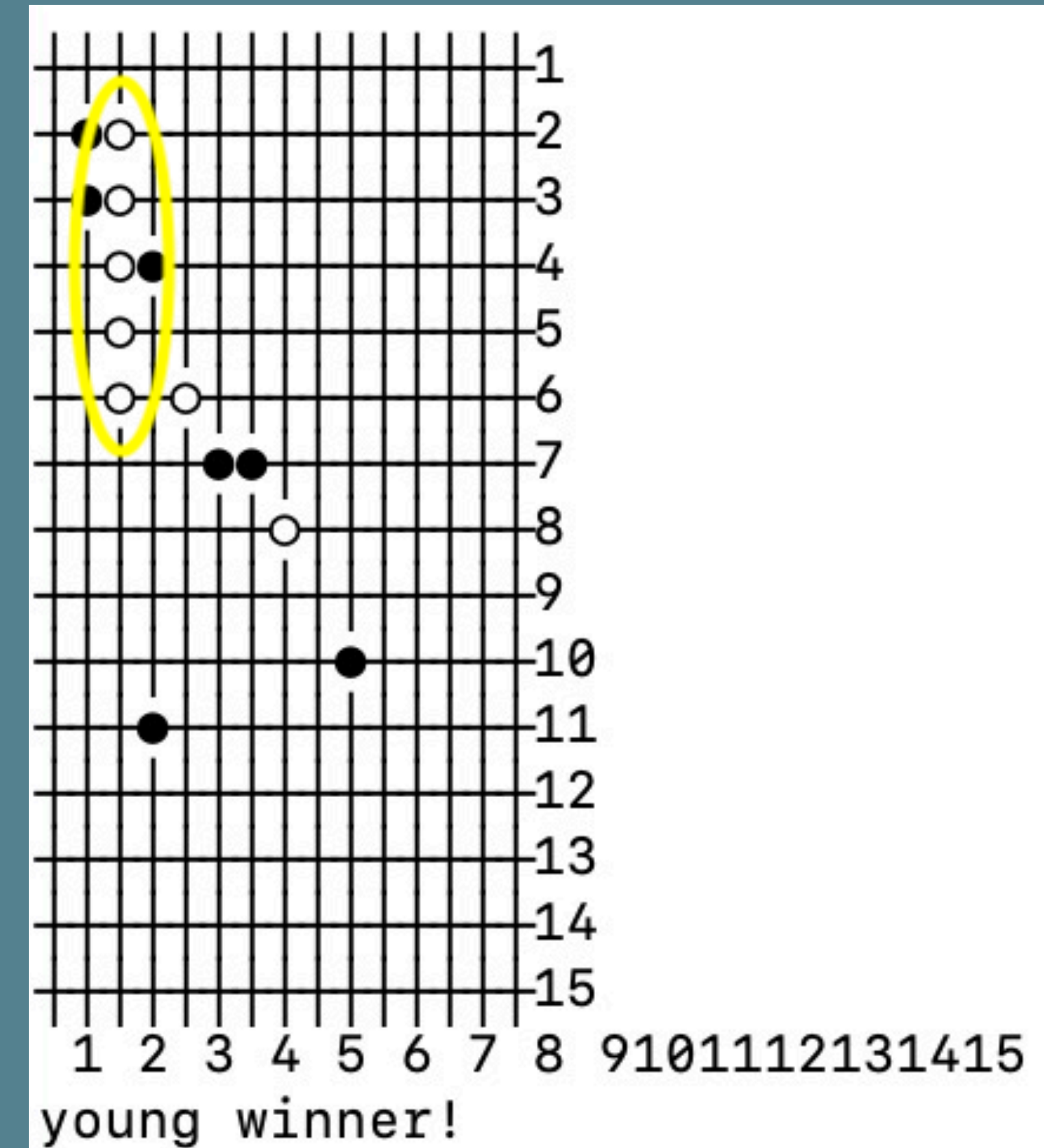


# OMOK GAME

**Goal: Building a OMOK game with c++ programming language**

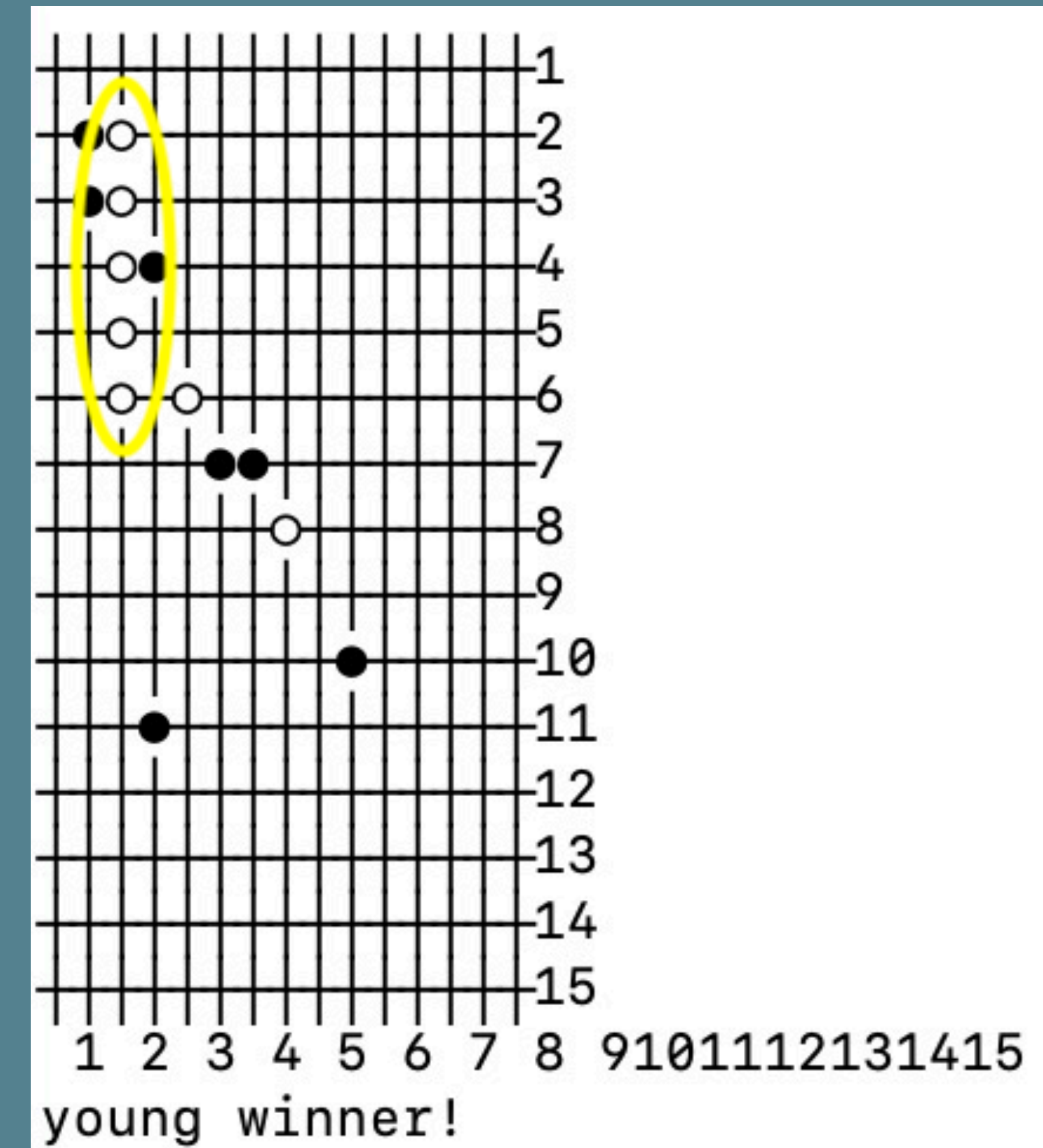
\*\*\*\*Omok Game\*\*\*\*

1. Put Id of player
2. Enter the coordinate of the grid until the winner being decided
3. Show the winner
4. Terminate the program

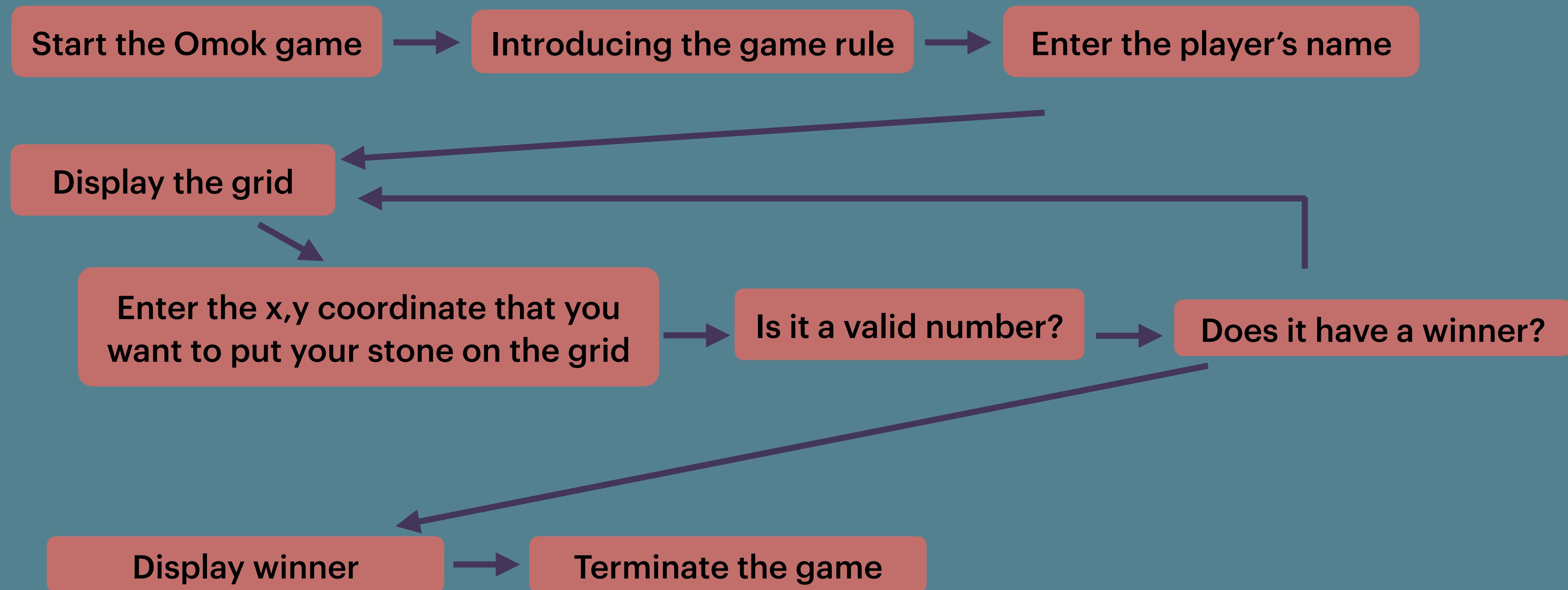


# OMOK GAME: GAME RULE

- **Two players play this game.**
- **One player will play with the white stone and the other player will play with the black stone.**
- **Players will put their stones in the grid one at a time at each turn.**
- **Player who has 5 stones in a row (horizontally, vertically, diagonally) is a winner**



# OMOK GAME: GAME ALGORITHM



# OMOK GAME: SUMMARY

There are 7 methods in this file.

```
public:
    Omok();                //Initialize the variable
    bool FindWinner(int k); //Check the winner
    void InputPoint();      //Enter the coordinate of the grid
    void PrintPoint();      //view the stone
    void InputID();         //input id
    void BattleGame();      //game
    void ViewGuide();       //view guide of the game
};
```



# OMOK GAME: SUMMARY

## 1. initializing the grid

```
Omok::Omok(){
    in_x=0;
    in_y=0;

    //initialize the grid
    for(int i=0;i<MAXROW;i++)
        for(int j=0;j<MAXCOL;j++)
            arr_OmokPan[i][j]=0;
}
```

## 2. View the Rule to the players

```
void Omok::ViewGuide(){
    cout << " " << endl;
    cout << "    ****Omok Game**** " << endl;
    cout << " " << endl;
    cout << " " << endl;
    cout << " 1. Put Id of player " << endl;
    cout << " 2. Enter the coordinate of the grid " << endl;
    cout << "    until the winner being decided " << endl;
    cout << " 3. Show the winner " << endl;
    cout << " 4. Terminate the program " << endl;
    cout << " " << endl;
    cout << " " << endl;
}
```

# OMOK GAME: SUMMARY

## 3. Get the players ID

```
void Omok::InputID() {
    char p_name[MAXNAME];
    cout << "Input player1 ID : ";
    while(1){
        cin >> p_name;
        if(strlen(p_name)>MAXNAME)
            continue;
        else
            break;
    }
    player1 = new char[strlen(p_name)];
    strcpy(player1, p_name);

    char p_name2[MAXNAME];
    cout << "Input player2 ID : ";
    while(1){
        cin >> p_name2;
        if(strlen(p_name2)>MAXNAME)
            continue;
        else
            break;
    }
    player2 = new char[strlen(p_name2)];
    strcpy(player2, p_name2);
    cout << "Start Omok Game(" << player1 << " VS " << player2 << ")!!!" << endl;
}
```

## 4. Game start

```
void Omok::BattleGame(){
    ViewGuide();
    InputID();
    PrintPoint();
    int player=0;

    while (1) {
        //select the player
        if (player%2 == 0)
            cout << "★" << player1 << "★" << endl;
        else
            cout << "★" << player2 << "★" << endl;

        InputPoint();
        cout << endl;

        if (arr_OmokPan[in_x-1][in_y-1] == 0) {
            arr_OmokPan[in_x-1][in_y-1] = player%2 + 1;
            PrintPoint();
            if (FindWinner(player%2+1)) {
                if (player%2+1 == 1)
                    cout << player1;
                else
                    cout << player2;
                cout << "is winner!" << endl;
                break;
            }
            player++;
        }
        else{
            cout << "It is not a valid coordinate. Please enter again." << endl;
        }
    }
}
```



# OMOK GAME: SUMMARY

## 5. Enter the coordinates of the grid

```
void Omok::InputPoint(void){
    //x coordinate value
    cout << "Enter the value of x coordinate :(1~" << MAXCOL << "):" << '\n';
    cin >> in_y;
    while (in_y < 1 || in_y > MAXCOL){
        cout << "It is not a valid value.";
        cout << "Enter the value of x coordinate :(1~" << MAXCOL << "):" << '\n';
        cin >> in_y;
    }
    // y coordinate value
    cout << "Enter the value of y coordinate :(1~" << MAXROW << ")" << '\n';
    cin >> in_x;
    while (in_x < 1 || in_x > MAXROW){
        cout << "It is not a valid value.";
        cout << "Enter the value of y coordinate:(1~" << MAXROW << ")" << '\n';
        cin >> in_x;
    }
}
```

## 6. View Stones

```
void Omok::PrintPoint(void){
    int i,j;
    for(i=0; i<MAXROW; i++){
        for(j=0; j<MAXCOL; j++){
            if(arr_OmokPan[i][j] == 0)
                cout<< "+";
            else if(arr_OmokPan[i][j] == 1)
                cout<< "●";
            else if(arr_OmokPan[i][j] == 2)
                cout<< "○";
        }
        cout<< i+1 << endl;
    }
    for(j=0;j<MAXCOL;j++){
        cout.width(2);
        cout<< j+1;
    }
    cout << endl;
}
```

# OMOK GAME: SUMMARY

## 7. Check the winner

```
bool Omok::FindWinner(int k){
    int i,j;

    for(i=0;i<MAXROW;i++){
        for(j=0;j<MAXCOL;j++){
            if(arr_OmokPan[i][j]==k && arr_OmokPan[i+1][j+1]==k && arr_OmokPan[i+2][j+2]==k
               && arr_OmokPan[i+3][j+3]==k && arr_OmokPan[i+4][j+4]==k)
                return true;
            else if(arr_OmokPan[i][j]==k && arr_OmokPan[i-1][j+1]==k &&
                    arr_OmokPan[i-2][j+2]==k && arr_OmokPan[i-3][j+3]==k &&
                    arr_OmokPan[i-4][j+4]==k)
                return true;
            else if(arr_OmokPan[i][j]==k && arr_OmokPan[i-1][j+1]==k &&
                    arr_OmokPan[i-2][j+2]==k && arr_OmokPan[i-3][j+3]==k &&
                    arr_OmokPan[i-4][j+4]==k)
                return true;
            else if(arr_OmokPan[i][j]==k && arr_OmokPan[i][j+1]==k && arr_OmokPan[i][j+2]==k
                    && arr_OmokPan[i][j+3]==k && arr_OmokPan[i][j+4]==k)
                return true;
            else if(arr_OmokPan[i][j]==k && arr_OmokPan[i+1][j]==k && arr_OmokPan[i+2][j]==k
                    && arr_OmokPan[i+3][j]==k && arr_OmokPan[i+4][j]==k)
                return true;
        }
    }
    return false;
}
```

**Find the winner  
exhaustively considering  
all the cases that winner  
can be produced.**



---

# OMOK GAME: SUMMARY

As a mac user, I edited the c++ code with 'xcode' text edit program. When running the program, I used terminal with command "g++ -o **term** omok.cpp," in the directory and to see the result, hit **"./term"**.

```
(base) Soyoungs-Macbook-Pro:term soyoungchung$ g++ -o term omok.cpp  
(base) Soyoungs-Macbook-Pro:term soyoungchung$ ./term
```

---

# OMOK GAME: RESULTS

**This program has time complexity of  $O(n^2)$ . The program contains nested 'for' loop since it has to search 2D array.**

**This program has the fastest algorithm.**