2024
28th of Sep. CS221 Assignment #1 Saturday

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Q#1:

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

struct UniverseCoordinate {// structure to hold coordinates and snake info
    int s_number; // snake number
    int x_position; // x-position in the grid
    int y_position; // y-position in the grid
    bool is_snake; // Flag to check if there's a snake
};


int main()
{   return 0;
}
```

Q#2:

```
#include<iostream>
#include<windows.h>
using namespace std;

struct UniverseCoordinate {//structure to hold coordinates and snake info
    int s_number; // snake number
    int x_position; // x_position in the grid
    int y_position; // y position in the grid
    bool is_snake; // Flag to check if there's a snake.
};

void update(UniverseCoordinate ** &universe, int x_rows, int y_colums); //updating array size
void drawTable(UniverseCoordinate** universe, int x_rows, int y_colums); //drawing 2D world in the end

int main() {
UniverseCoordinate ** universe = new UniverseCoordinate*[2]; //initial 2D arra
for (int i = 0; i<2; i++)
  { universe[i] = new UniverseCoordinate[2]; // initialize rows}

cout << "welcome to 2D world of snakes!" << endl;
 char choice;
 int x_rows, y_columns;
cout<< "Do you want to update size of your 2D world or would
      go with the standard 2x2 size? y/n:";
cin >> choice;
system("cls");
```

```
if(choice == 'Y' || choice == 'y'){
   cout<< endl<< "Enter number of rows: ",
   cin >> x_rows;
   cout << endl<< "Enter number of columns: ",
    cin >> y_columns,
    cout <<endl;
    update( universe, x_rows, y_columns);//update universe size
} else {
      x_rows = 2   // Default size
      y_columns = 2
}
cout << "Press S where you find snakes: "<<endl,
 system("pause"),
 int snake = 0;
 for(int i=0 ; i<x_rows; i++)
 {   for(int j=0; j< y_columns; j++){
        system("cls"),
       universe[i][j] .xposition = i // Set positions
       universe [i][j]. y_position = j
       cout << "Can you see snake at this position: (" <<i<<", "
           << j << "). S/n: ";
       char choice2;
       cin >> choice2;
       if (choice2 == 'S' || choice2 == 's')
       {  snake++;
          universe[i][j]. s_number = snake; // Assign snake num
          universe[i][j]. is_snake = true; // mark as snake.
       }
```

```
    else {
      universe[i][j].is_snake = false; // No snake
      universe[i][j].s_number = 0;
    }
  }
}
drawTable(universe, x_rows, y_columns); // Draw Universe
  for(int i = 0; i < x_rows; i++) {
      delete[] universe[i]; // De allocate each row
  }
  delete[] universe;
  return 0;
}

void update(UniverseCoordinate **&universe, int x_rows, y_columns)
{ UniverseCoordinate **tmp = new UniverseCoordinate *[x_rows];
    for(int i = 0; i < x_rows; i++) {
        tmp[i] = new UniverseCoordinate[y_columns]; }
   for(int i = 0; i < 2; i++) {
        delete[] universe[i]; }
   delete universe; // Delete Old Universe
   universe = tmp; // Point to new universe
   cout << "Update successfully!" << endl;
}

void drawTable(UniverseCoordinate **universe, int x_rows, int y_columns)
{ system("cls");
```

```
cout << endl << "2D world of snake: \n";
    for (int j=0; j<y_columns; j++) {
        cout << "+--------"; // print top border
    }
    cout << "+" << endl;

    for (int i = 0; i< x_rows; i++) {
        for (int j=0; j<y_columns; j++) {
                if (universe[i][j].is_snake)
            { cout << "| S" << universe[i][j].s_number << "  ";
            } else {
                cout << "|      "; // Empty space
                }
            }
        cout << "|" << endl;
        for (int j=0; j<y_columns; j++)
        { cout << "+--------"; // print bottom borde
        }
        cout << "+" << endl
    }
}
```