MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | (Global Scope) | main()

```cpp
#include "MonsterWorld103.h"
#include "VariousMonsters103.h"
#include "Human103.h"
#include <time.h>

void main()
{
    srand((unsigned int)time(NULL));
    int w = 16, h = 8;
    MonsterWorld game(w, h);

    game.add(new Zombie("허접한좀비", "§", rand() % w, rand() % h));
    game.add(new Vampire("뱀파이어짱", "★", rand() % w, rand() % h));
    game.add(new KGhost("어쩌다귀신", "♥", rand() % w, rand() % h));
    game.add(new Jiangshi("못먹어도고", "↔", rand() % w, rand() % h, true));
    game.add(new Jiangshi("못먹어도고", "↕", rand() % w, rand() % h, false));
    game.add(new Tuman("미래의좌파", "좌", rand() % w, rand() % h));
    game.add(new Tuman("미래의우파", "우", rand() % w, rand() % h));
    game.play(500, 10);
    printf("------게임 종료-----------\n");
}
```

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe

```
[ Monster World (Dynamic World) ]
■■■■■■■↔■■■■■■■■
■■■■■■■■■■■■■■♥■
■■■■■■■■■■■■■■■■
■■■■■■■■■■■■■■■■
■■■■■■■■■■■■■■좌■
§■■■■■■■■■■■■■■■
■■■우■■↕■■■■■■■■
★■■■■■■■■■■■■■■■

 전체 이동 횟수 = 0
 남은 아이템 수 = 128
        허접한좀비§:0
        뱀파이어짱★:0
        어쩌다귀신♥:0
        못먹어도고↔:0
        못먹어도고↕:0
        미래의좌파좌:0
        미래의우파우:0
 엔터를 누르세요...
```

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Jiangshi

```cpp
#pragma once
#include "Monster103.h"

class Zombie : public Monster {
public:
    Zombie(string n = "허접좀비", string i = "§", int x = 0, int y = 0)
        : Monster(n, i, x, y) {}
    ~Zombie() { cout << " Zombie "; }
};

class Vampire : public Monster {
public:
    Vampire(string n = "뱀파이어", string i = "★", int x = 0, int y = 0)
        : Monster(n, i, x, y) {}
    ~Vampire() { cout << " Vampire"; }

    void move(int** map, int maxx, int maxy) {
        int dir = rand() % 4;
        if (dir == 0) x--;
        else if (dir == 1) x++;
        else if (dir == 2) y--;
        else y++;
        clip(maxx, maxy);
        eat(map);
    }
};

class KGhost : public Monster {
public:
    KGhost(string n = "처녀귀신", string i = "♥", int x = 0, int y = 0)
        : Monster(n, i, x, y) {}
    ~KGhost() { cout << " KGhost "; }

    void move(int** map, int maxx, int maxy) {
        x = rand() % maxx;
        y = rand() % maxy;
        clip(maxx, maxy);
        eat(map);
```

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe

```
[ Monster World (Dynamic World) ]
.■■...↔....■♥■■■
■■■■■■■■■■■■■■.■
■.■■■■.■■■■■■■■■
.■■■.■↕■.■■■■■■■
..■.■■.■.■■■■■좌■
.★.§■■.■■■.■■■■■
..■우■■.■■.■■■■■■
■■■■■■.■■■..■■■■

 전체 이동 횟수 = 14
 남은 아이템 수 = 93
        허접한좀비§:8
        뱀파이어짱★:2
        어쩌다귀신♥:12
        못먹어도고↔:7
        못먹어도고↕:6
        미래의좌파좌:0
        미래의우파우:0
```

79 % | No issues found | Ln: 57 Ch: 3 TABS CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Vampire | move(int ** map, int maxx, int maxy)

```cpp
    void move(int** map, int maxx, int maxy) {
        x = rand() % maxx;
        y = rand() % maxy;
        clip(maxx, maxy);
        eat(map);
    }
};

class Jiangshi : public Monster {
    bool bHori;
public:
    Jiangshi(string n = "대륙강시", string i = "↔", int x = 0, int y = 0, bool bH = true)
        : Monster(n, i, x, y), bHori(bH) {}
    ~Jiangshi() { cout << " Jangshi"; }

    void move(int** map, int maxx, int maxy) {
        int dir = rand() % 2;
        int jump = rand() % 2 + 1;
        if (bHori) x += ((dir == 0) ? -jump : jump);
        else y += ((dir == 0) ? -jump : jump);
        clip(maxx, maxy);
        eat(map);
    }
};
```

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe

```
[ Monster World (Dynamic World) ]
..↔.§...........
...........■...우
...........■....
............■...
..........■■....
......↕..■...■■.
....★...■..■■...
....♥..■■■...■■좌

 전체 이동 횟수 = 163
 남은 아이템 수 = 16
        허접한좀비§:27
        뱀파이어짱★:11
        어쩌다귀신♥:47
        못먹어도고↔:10
        못먹어도고↕:7
        미래의좌파좌:6
        미래의우파우:4
```

79 % | No issues found | Ln: 22 Ch: 12 Col: 18 TABS CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | **Human103.h** | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Tuman | moveHuman(int ** map, int maxx, int maxy, char ch)

```cpp
#pragma once
#include "Monster103.h"
#include <conio.h>
enum Direction { Left = 75, Right = 77, Up = 72, Down = 80 };

class Human : public Monster {
public:
    Human(string n = "미래인류", string i = "웃", int px = 0, int py = 0)
        : Monster(n, i, px, py) {}
    ~Human() { cout << " [Human ]"; }

    int getDirKey() { return _getche() == 224 ? _getche() : 0; }

    void move(int** map, int maxx, int maxy) {
        if (_kbhit())
        {
            char ch = getDirKey();
            if (ch == Left) x--;
            else if (ch == Right) x++;
            else if (ch == Up) y--;
            else if (ch == Down) y++;
            else return;
            clip(maxx, maxy);
            eat(map);
        }
    }
};

class Tuman : public Human {
public:
    Tuman(string n = "투맨인류", string i = "웃", int px = 0, int py = 0)
        : Human(n, i, px, py) {}
    ~Tuman() { cout << " [Tuman ]"; }

    void moveHuman(int** map, int maxx, int maxy, char ch) {

        if (ch == Left || ch == 'a') x--;
        else if (ch == Right || ch == 'd') x++;
```

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe

```
[ Monster World (Dynamic World) ]
. § . ★ . . . . . ↔ . . . .
. . . . . ■ . . . 웃
. . . . . ↕ . . . . . ♥ .
. . . . . ■ . . . .
. . . . . ■ . . . ■■ .
. . . . . ■ . . .
. . . . . 좌 . . . . . .

전체 이동 횟수 = 279
남은 아이템 수 = 6
        허접한좀비§:27
        뱀파이어짱★:11
        어쩌다귀신♥:54
        못먹어도고↔:10
        못먹어도고↕:7
        미래의좌파좌:9
        미래의우파우:4
```

79 % | No issues found | Ln: 43 | Ch: 12 | Col: 18 | TABS | CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | **Human103.h** | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Human | move(int ** map, int maxx, int maxy)

```cpp
    void moveHuman(int** map, int maxx, int maxy, char ch) {

        if (ch == Left || ch == 'a') x--;
        else if (ch == Right || ch == 'd') x++;
        else if (ch == Up || ch == 'w') y--;
        else if (ch == Down || ch == 's') y++;
        else return;
        clip(maxx, maxy);
        eat(map);
    }
};
```

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe

```
[ Monster World (Dynamic World) ]
. . . . ↔ . . . . . . . . .
. . . . . ♥ 웃 . . . . . .
. . § . . ↕ . . . . . . . .
. . . . . . . . . . . . . .
. . . . . . . . . . . . . .
. . . . . . . . . . . ■■ .
. . . . . . . . . . ■ . . .
. . . . . 좌 . . . . . .

전체 이동 횟수 = 400
남은 아이템 수 = 3
        허접한좀비§:27
        뱀파이어짱★:11
        어쩌다귀신♥:56
        못먹어도고↔:10
        못먹어도고↕:7
        미래의좌파좌:9
        미래의우파우:5
```

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | **Monster103.h** | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Monster | move(int ** map, int maxx, int maxy)

```cpp
#pragma once
#include "Canvas103.h"
#define DIM 40

class Monster
{
public:
    string name, icon;
    int x, y, nItem;

    void clip(int maxx, int maxy) {
        if (x < 0) x = 0;
        if (x >= maxx) x = maxx - 1;
        if (y < 0)y = 0;
        if (y >= maxy)y = maxy - 1;
    }
    void eat(int** map) {
        if (map[y][x] == 1)
        {
            map[y][x] = 0;
            nItem++;
        }
    }
public:
    Monster(string n = "나괴물", string i = "※", int px = 0, int py = 0)
        : name(n), icon(i), x(px), y(py), nItem(0) { }
    virtual ~Monster() { cout << "\t" << name << icon << "물러갑니다~~~\n"; }

    void draw(Canvas& canvas) { canvas.draw(x, y, icon); }
    virtual void move(int** map, int maxx, int maxy) {
        switch (rand() % 8)
        {
        case 0: y--; break;
        case 1: x++; y--; break;
        case 2: x++; break;
        case 3: x++; y++; break;
        case 4: y++; break;
        case 5: x--; y++; break;
```

Microsoft Visual Studio Debug Console

```
[ Monster World (Dynamic World) ]
. . . . . ↔ . . . . . . . . .
. . . . . ↕ . . 우 . . . . . .
. . . . . . . . . . . . . .
. . . . § . . . . . . . . .
. . . . . . . . . . . . . .
. . . ♥ . . . . . . . ★ . .
. . . . . . . . . . . . . .
. . . . . 좌 . . . . . .

전체 이동 횟수 = 478
남은 아이템 수 = 0
        허접한좀비§:27
        뱀파이어짱★:12
        어쩌다귀신♥:58
        못먹어도고↔:10
        못먹어도고↕:7
        미래의좌파좌:9
        미래의우파우:5
------게임 종료------------
Zombie          허접한좀비§물러갑니다~~~
Vampire         뱀파이어짱★물러갑니다~~~
KGhost          어쩌다귀신♥물러갑니다~~~
Jangshi         못먹어도고↔물러갑니다~~~
Jangshi         못먹어도고↕물러갑니다~~~
[Tuman ] [Human ]       미래의좌파좌물러갑니다~~~
[Tuman ] [Human ]       미래의우파우물러갑니다~~~

C:₩Users₩user₩source₩repos₩Week10_Homework3₩x64₩Debug₩Week10_Homework3.exe (pro
Press any key to close this window . . .
```

79 % | No issues found | Ln: 32 | Ch: 4 | Col: 10 | TABS | CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Monster | move(int ** map, int maxx, int maxy)

```
        case 1: x++; y--; break;
        case 2: x++; break;
        case 3: x++; y++; break;
        case 4: y++; break;
        case 5: x--; y++; break;
        case 6: x--; break;
        case 7: x--; y--; break;
        }
        clip(maxx, maxy);
        eat(map);
    }
    void print() { cout << "\t" << name << icon << ":" << nItem << endl; }
};
```

Microsoft Visual Studio Debug Console

```
[ Monster World (Dynamic World) ]
. . . . . ↔ . . . . . .
. . . . . ↕ . 우. . . . .
. . . . . . . . . . . .
. . . . § . . . . . . . .
. . . . . . . . . . . . .
. . . ♥ . . . . . . ★ . .
. . . . . . . . . . . . .
. . . . . 좌. . . . . .

전체 이동 횟수 = 478
남은 아이템 수 = 0
        허접한좀비§:27
        뱀파이어짱★:12
        어쩌다귀신♥:58
        못먹어도고↔:10
        못먹어도고↕:7
        미래의좌파좌:9
        미래의우파우:5
------게임 종료------------
Zombie          허접한좀비§물러갑니다~~~
Vampire         뱀파이어짱★물러갑니다~~~
KGhost          어쩌다귀신♥물러갑니다~~~
Jangshi         못먹어도고↔물러갑니다~~~
Jangshi         못먹어도고↕물러갑니다~~~
[Tuman ] [Human ]       미래의좌파좌물러갑니다~~~
[Tuman ] [Human ]       미래의우파우물러갑니다~~~
```

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | MonsterWorld | play(int maxwalk, int wait)

```
#pragma once
#include "Canvas103.h"
#include "Matrix103.h"
#include "VariousMonsters103.h"
#include "Human103.h"
#include <Windows.h>
#define MAXMONS 8

class MonsterWorld
{
    Matrix world;
    int xMax, yMax, nMon, nMove;
    Monster* pMon[MAXMONS];
    Canvas canvas;

    int& Map(int x, int y) { return world.elem(x, y); }
    bool isDone() { return countItems() == 0; }
    int countItems() {
        int nItems = 0;
        for (int y = 0; y < yMax; y++)
            for (int x = 0; x < xMax; x++)
                if (Map(x, y) > 0) nItems++;
        return nItems;
    }
    void print() {
        canvas.clear(". ");
        for (int y = 0; y < yMax; y++)
            for (int x = 0; x < xMax; x++)
                if (Map(x, y) > 0) canvas.draw(x, y, "■");
        for (int i = 0; i < nMon; i++)
            pMon[i]->draw(canvas);
        canvas.print("[ Monster World (Dynamic World) ]");

        cerr << " 전체 이동 횟수 = " << nMove << endl;
        cerr << " 남은 아이템 수 = " << countItems() << endl;
        for (int i = 0; i < nMon; i++) pMon[i]->print();
    }
public:
```

79 % | No issues found | Ln: 53 | Ch: 13 | Col: 19 | TABS | CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | (Global Scope)

```
    MonsterWorld(int w, int h) : world(h, w), canvas(w, h), xMax(w), yMax(h) {
        nMon = 0;
        nMove = 0;
        for (int y = 0; y < yMax; y++)
            for (int x = 0; x < xMax; x++) Map(x, y) = 1;
    }
    ~MonsterWorld() {
        for (int i = 0; i < nMon; i++)
            delete pMon[i];
    }
    void add(Monster* m) { if (nMon < MAXMONS) pMon[nMon++] = m; }
    void play(int maxwalk, int wait) {
        print();
        cerr << " 엔터를 누르세요...";
        getchar();
        for (int i = 0; i < maxwalk; i++)
        {
            for (int k = 0; k < nMon - 2; k++)
                pMon[k]->move(world.Data(), xMax, yMax);

            if (_kbhit())
            {
                unsigned char ch = _getche();
                if (ch == 224)
                {
                    ch = _getche();
                    ((Tuman*)(pMon[nMon - 1]))->moveHuman(world.Data(), xMax, yMax, ch);
                }
                else ((Tuman*)(pMon[nMon - 2]))->moveHuman(world.Data(), xMax, yMax, ch);
            }

            nMove++;
            print();
            if (isDone()) break;
            Sleep(wait);
        }
    }
};
```

79 % | No issues found | Ln: 8 | Ch: 1 | TABS | CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Matrix

```cpp
#pragma once
#include <iostream>
#include <iomanip>
using namespace std;

class Matrix
{
    int rows, cols;
    int** mat;
public:
    Matrix(int r = 0, int c = 0) : rows(r), cols(c), mat(NULL) {
        mat = new int* [rows];
        for (int i = 0; i < rows; i++) mat[i] = new int[cols];
    }
    ~Matrix() {
        if (mat != NULL)
        {
            for (int i = 0; i < rows; i++)
                delete[] mat[i];
            delete[] mat;
        }
    }
    int& elem(int x, int y) { return mat[y][x]; }
    int Rows() { return rows; }
    int Cols() { return cols; }
    int** Data() { return mat; };
    void print(const char* str = "Mat") {
        cout << str << " " << rows << "x" << cols << endl;
        for (int i = 0; i < rows; i++)
        {
            for (int j = 0; j < cols; j++)
                cout << setw(4) << mat[i][j];
            cout << "\n";
        }
    }
    void setRand(int val = 100) {
        if (mat != NULL)
        {
```

79 % | No issues found | Ln: 44 | Ch: 3 | TABS | CRLF

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Matrix | ~Matrix()

```cpp
        }
    }
    void setRand(int val = 100) {
        if (mat != NULL)
        {
            for (int i = 0; i < rows; i++)
                for (int j = 0; j < cols; j++)
                    mat[i][j] = (rand() % val);
        }
    }
};
```

MonsterWorldGame103.cpp | VariousMonsters103.h | Human103.h | Monster103.h | MonsterWorld103.h | Matrix103.h | Canvas103.h

Week10_Homework3 | Canvas

```cpp
#pragma once
#include <iostream>
#include <string>
#define MAXLINES 100
using namespace std;

class Canvas
{
    string line[MAXLINES];
    int xMax, yMax;
public:
    Canvas(int nx = 10, int ny = 10) : xMax(nx), yMax(ny) {
        for (int y = 0; y < yMax; y++)
            line[y] = string(xMax * 2, ' ');
    }
    void draw(int x, int y, string val) {
        if (x >= 0 && y >= 0 && x < xMax && y < yMax)
            line[y].replace(x * 2, 2, val);
    }
    void clear(string val = "  ") {
        for (int y = 0; y < yMax; y++)
            for (int x = 0; x < xMax; x++)
                draw(x, y, val);
    }
    void print(const char* title = "<My Canvas>") {
        system("cls");
        cout << title << endl;
        for (int y = 0; y < yMax; y++)
            cout << line[y] << endl;
        cout << endl;
    }
};
```

79 % | No issues found | Ln: 32 | Ch: 3 | TABS | CRLF