

MineSweeper2.cpp

Week5_Homework2 (Global Scope)

```
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <string.h>
4 #include <conio.h>
5 #include <memory.h>
6 #include <time.h>
7 #include <ctype.h>
8
9 enum LabelType { Empty = 0, Bomb = 9 };
10 enum MaskType { Hide = 0, Open, Flag };
11 static int MineMapMask[40][80];
12 static int MineMapLabel[40][80];
13 static int nx, ny;
14 static int nBomb;
15
16 inline int& mask(int x, int y) { return MineMapMask[y][x]; }
17 inline int& label(int x, int y) { return MineMapLabel[y][x]; }
18 inline bool isValid(int x, int y) { return (x >= 0 && x < nx && y >= 0 && y < ny); }
19 inline bool isBomb(int x, int y) { return isValid(x, y) && label(x, y) == Bomb; }
20 inline bool isEmpty(int x, int y) { return isValid(x, y) && label(x, y) == Empty; }
21
22 static void dig(int x, int y)
23 {
24     if (isValid(x, y) && mask(x, y) != Open)
25     {
26         mask(x, y) = Open;
27         if (label(x, y) == 0)
28         {
29             dig(x - 1, y - 1);
30             dig(x - 1, y);
31             dig(x - 1, y + 1);
32             dig(x, y - 1);
33             dig(x, y + 1);
34             dig(x + 1, y - 1);
35             dig(x + 1, y);
36             dig(x + 1, y + 1);
37         }
38     }
39 }
40
41 static void mark(int x, int y)
42 {
43     if (isValid(x, y) && mask(x, y) == Hide) mask(x, y) = Flag;
44 }
45
46 static int getBombCount()
47 {
48     int count = 0;
49     for (int y = 0; y < ny; y++)
50         for (int x = 0; x < nx; x++)
51             if (mask(x, y) == Flag) count++;
52     return count;
53 }
54
55 static void print()
56 {
57     system("cls");
58     printf(" 발견 : %2d 전체 : %2d\n", getBombCount(), nBomb);
59     printf(" ");
60     for (int i = 0; i < nx; i++) printf("%2d", i + 1);
61     printf("\n");
62     for (int y = 0; y < ny; y++)
63     {
64         printf("%2d", y + 1);
65         for (int x = 0; x < nx; x++)
66         {
67             if (mask(x, y) == Hide) printf("□");
68             else if (mask(x, y) == Flag) printf("★");
69             else
70             {
71                 if (label(x, y) == Bomb) printf("B");
72                 else printf("%2d", label(x, y));
73             }
74         }
75         printf("\n");
76     }
77 }
78
79 static int countNbrBombs(int x, int y)
80 {
81     int count = 0;
82     for (int yy = y - 1; yy <= y + 1; yy++)
83         for (int xx = x - 1; xx <= x + 1; xx++)
84             if (isValid(xx, yy) && label(xx, yy) == Bomb) count++;
85     return count;
86 }
87
88 static void init(int w, int h, int total = 9)
89 {
90     nx = w;
91     ny = h;
92     nBomb = total;
93     srand((unsigned int)time(NULL));
94     for (int y = 0; y < ny; y++)
95         for (int x = 0; x < nx; x++)
96         {
97             mask(x, y) = Hide;
98             label(x, y) = 0;
99         }
100     for (int i = 0; i < nBomb; i++)
101     {
102         int x, y;
103         do {
104             x = rand() % nx;
105             y = rand() % ny;
106         } while (mask(x, y) != Hide);
107         label(x, y) = Bomb;
108     }
109 }
```

C:\Users\User\source\repos\Week5_Homework2\Week5_Homework2.exe

<Mine Sweeper>
지뢰맵의 크기 입력 (가로 세로) : 10 20
매설할 총 지뢰의 개수 입력 : 20

MineSweeper2.cpp

Week5_Homework2 (Global Scope) dig(int x, int y)

```
36 dig(x + 1, y + 1);
37 }
38 }
39 }
40
41 static void mark(int x, int y)
42 {
43     if (isValid(x, y) && mask(x, y) == Hide) mask(x, y) = Flag;
44 }
45
46 static int getBombCount()
47 {
48     int count = 0;
49     for (int y = 0; y < ny; y++)
50         for (int x = 0; x < nx; x++)
51             if (mask(x, y) == Flag) count++;
52     return count;
53 }
54
55 static void print()
56 {
57     system("cls");
58     printf(" 발견 : %2d 전체 : %2d\n", getBombCount(), nBomb);
59     printf(" ");
60     for (int i = 0; i < nx; i++) printf("%2d", i + 1);
61     printf("\n");
62     for (int y = 0; y < ny; y++)
63     {
64         printf("%2d", y + 1);
65         for (int x = 0; x < nx; x++)
66         {
67             if (mask(x, y) == Hide) printf("□");
68             else if (mask(x, y) == Flag) printf("★");
69             else
70             {
71                 if (label(x, y) == Bomb) printf("B");
72                 else printf("%2d", label(x, y));
73             }
74         }
75         printf("\n");
76     }
77 }
```

C:\Users\User\source\repos\Week5_Homework2\Week5_Homework2.exe

발견 : 0 전체 : 20
1 2 3 4 5 6 7 8 9 10
1 □ □ □ □ □ □ □ □ □ □
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행번호 열번호 [지뢰:p] <enter> -->

MineSweeper2.cpp

Week5_Homework2 (Global Scope) getBombCount()

```
71 {
72     if (isBomb(x, y)) printf("%2d");
73     else if (isEmpty(x, y)) printf(" ");
74     else printf("%2d", label(x, y));
75 }
76 }
77 printf("\n");
78 }
79 }
80
81 static int countNbrBombs(int x, int y)
82 {
83     int count = 0;
84     for (int yy = y - 1; yy <= y + 1; yy++)
85         for (int xx = x - 1; xx <= x + 1; xx++)
86             if (isValid(xx, yy) && label(xx, yy) == Bomb) count++;
87     return count;
88 }
89
90 static void init(int w, int h, int total = 9)
91 {
92     nx = w;
93     ny = h;
94     nBomb = total;
95     srand((unsigned int)time(NULL));
96     for (int y = 0; y < ny; y++)
97         for (int x = 0; x < nx; x++)
98         {
99             mask(x, y) = Hide;
100             label(x, y) = 0;
101         }
102     for (int i = 0; i < nBomb; i++)
103     {
104         int x, y;
105         do {
106             x = rand() % nx;
107             y = rand() % ny;
108         } while (mask(x, y) != Hide);
109         label(x, y) = Bomb;
110     }
111 }
```

C:\Users\User\source\repos\Week5_Homework2\Week5_Homework2.exe

발견 : 0 전체 : 20
1 2 3 4 5 6 7 8 9 10
1 □ □ □ □ □ □ □ □ □ □
2 □ □ □ □ □ □ □ □ □ □
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5 □ 3 □ 1 □ □ □ □ □ □
6 □ 2 □ 1 □ 1 1 1 1
7 1 1 □ 2 2 2 □ 1 1
8 □ □ □ 1 □ 1 □ □
9 1 1 □ 2 2 2 □ 1 1
10 □ 2 1 □ □ 1 □ □ □
11 □ □ 1 □ 1 1 1 □ □
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행번호 열번호 [지뢰:p] <enter> -->

MineSweeper2.cpp

Week5_Homework2

(Global Scope)

init(int w, int h, int total)

106

int x, y;

107

do

108

{

109

x = rand() % nx;

110

y = rand() % ny;

111

while (label(x, y) != Empty);

112

label(x, y) = Bomb;

113

}

114

for (int y = 0; y < ny; y++)

115

for (int x = 0; x < nx; x++)

116

if (label(x, y) == Empty) label(x, y) = countNbrBombs(x, y);

117

}

118

119

static bool getPos(int& x, int& y)

120

{

121

char str[80], opt[3];

122

printf("\n 행번호 열번호 [지뢰:p] <enter> --> ");

123

gets_s(str);

124

125

int ret = sscanf_s(str, "%d%d%s", &y, &x, opt);

126

x--;

127

y--;

128

return (ret == 3);

129

}

130

131

static int checkDone()

132

{

133

int count = 0;

134

for (int y = 0; y < ny; y++)

135

for (int x = 0; x < nx; x++)

136

{

137

if (mask(x, y) != Open) count++;

138

else if (isBomb(x, y)) return -1;

139

}

140

return (count == nBomb) ? 1 : 0;

141

}

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Microsoft Visual Studio Debug Console

발견 : 0 전체 : 20

1 2 3 4 5 6 7 8 9 10

1 1 1 1 1

2 1 1 2 2 2 1 1 1

3 2 2 2 1 1 1 1

4 3 2 1 1 1 1 1

5 3 1 1 1 1 1

6 2 1 1 1 1 1

7 1 1 2 2 2 1 1

8 1 1 1 1 1

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11 2 1 1 1 1

12 1 1

13 1 1

14 2 2 2 1

15 1 1

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17 1 1 1 1 1 1 1 1

18 1 1 1 1 1 1 1 1

19 1 1 1 1 1 1 1 1

20 1 1 1 1 1 1 1 1

실패 : 지뢰 폭발!!!

C:\Users\User\source\repos\Week5_Homework2\Week5_Homework2.exe (process 24996) exited with code 0

Press any key to close this window . . .

MineSweeper2.cpp

Week5_Homework2

(Global Scope)

getPos(int &x, int &y)

141

}

142

143

void playMineSweeper(int width, int height, int total)

144

{

145

int x, y, status;

146

init(width, height, total);

147

do

148

{

149

print();

150

bool isBomb = getPos(x, y);

151

if (isBomb) mark(x, y);

152

else dig(x, y);

153

status = checkDone();

154

} while (status == 0);

155

156

print();

157

if (status < 0) printf("\n실패 : 지뢰 폭발!!!\n");

158

else printf("\n성공 : 탐색 성공!!!\n");

159

}

160

161

void main()

162

{

163

int width, height, total;

164

printf(" <Mine Sweeper>\n");

165

printf("지뢰맵의 크기 입력 (가로 세로) : ");

166

scanf_s("%d%d", &width, &height);

167

printf("매설할 총 지뢰의 개수 입력 : ");

168

scanf_s("%d", &total);

169

170

playMineSweeper(width, height, total);

171

}

172

17

