得分

HWK4

老鼠走迷宮

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```cpp
#include <iostream>
#include <fstream>
#include <windows.h>
#include <dos.h>
#include <conio.h>
#define x_max 200
#define y_max 200
using namespace std;

typedef struct{
    int type;
}note;

typedef struct{
    int x, y;
}point;

point nextpoint(point now, note a[][y_max]);
void clearline(int n);
void pause(int n);
void gotoxy(int x, int y);
void ConsoleFullScreen();
void setColor(int color);
void char_to_notearray(note a[][y_max], char in[], int n, int *x, int *y);
void printSwitch(int a);
void print_map(note a[][y_max], int x, int y);
void foodpoint(point p, note a[][y_max]);
void mouse_stack(note a[][y_max], int x, int y, int gox, int goy);
void print_mouse_point(int x);
void runtime();
bool CheakAll(point p, note a);
bool not1or3(point p, note a[][y_max]);
int InDate(char in[]);

//全域變數
int mouse_point = 500;
int op = 1;
int op4or8 = 1;
int time = 10;
int timeop = 10;
```

```
41.
42. int main ( void )
43. {
44.     int t;
45.     int x = 0, y = 0, n = 0;
46.     int gox, goy;
47.     char in[x_max * y_max];
48.     note a[x_max][y_max];
49.
50.     ConsoleFullScreen();
51.
52.     //讀入迷宮地圖
53.     n = InDate(in);
54.     char_to_notearray(a, in, n, &x, &y);
55.     //列印地圖
56.     print_map(a, x, y);
57.
58.     //輸入老鼠投放位置
59.     bool run = true;
60.     cout << "\n 請輸入老鼠要投置位置(x, y):";
61.     do
62.     {
63.         cin >> goy >> gox;
64.         if(a[gox][goy].type == '1') clearline(x + 3), gotoxy(x + 3, 0), cout << "牆壁無法投放，再輸
    入一次。";
65.         else if(gox >= x || goy >= y || (gox >= x && goy >= y)) clearline(x + 3), gotoxy(x + 3, 0)
    , cout << "超出範圍，再輸入一次。";
66.         else run = false;
67.     }
68.     while(run);
69.
70.     cout << "請輸入老鼠要行走的速度(數字越小越快):";
71.     do
72.     {
73.         cin >> time;
74.         if(time <= 0) clearline(x + 4), gotoxy(x + 4, 0), cout << "時間輸入錯誤";
75.     }
76.     while(time <= 0);
77.     timeop = time;
78.
```

```
79.     cout << "請輸入老鼠可行走的方位(4 or 8):";
80.     do
81.     {
82.         cin >> t;
83.         if (t == 4 || t == 8) op4or8 = t;
84.         else clearline(x + 5), gotoxy(x + 5, 0), cout << "方位輸入錯誤";
85.     }
86.     while(t != 8 && t != 4);
87.
88.     //老鼠投放至起始位置
89.     gotoxy(2 + gox, goy * 2);
90.     printSwitch('@');
91.     print_mouse_point(x);
92.     pause(x + 16);
93.
94.     //老鼠開跑囉!!!!
95.     mouse_stack(a, x, y, gox, goy);
96.
97.     //結束!!
98.     pause(x + 16);
99. }
100.
101.  void clearline(int n)
102.  {
103.      gotoxy(n, 0);
104.      cout << "
    ";
105.  }
106.
107.  void ConsoleFullScreen()
108.  {
109.      keybd_event(VK_MENU,0x38,0,0);
110.      keybd_event(VK_RETURN,0x1c,0,0);
111.      keybd_event(VK_MENU,0xb8,KEYEVENTF_KEYUP,0);
112.      keybd_event(VK_RETURN,0x9c,KEYEVENTF_KEYUP,0);
113.  }
114.
115.  void pause(int n)
116.  {
117.      gotoxy(n, 0);
```

```
118.      system("pause");
119.      gotoxy(n, 0);
120.      cout << "                                          ";
121.  }
122.
123.  void gotoxy(int x, int y)
124.  {
125.      static HANDLE o = GetStdHandle (STD_OUTPUT_HANDLE);
126.      COORD c = {y, x};
127.      SetConsoleCursorPosition (o, c);
128.  }
129.
130.  void setColor(int color)
131.  {
132.      HANDLE hConsole;
133.      hConsole = GetStdHandle (STD_OUTPUT_HANDLE);
134.      SetConsoleTextAttribute(hConsole, color);
135.  }
136.
137.  int InDate(char in[])
138.  {
139.      fstream InF;
140.      int n = 0;
141.      char FName[20], ch;
142.      cout << "輸入方程式檔名:";
143.      cin >> FName;
144.      InF.open(FName, ios::in);
145.      if(!InF)
146.      {
147.          cout << "檔案無法開啟\n";
148.          exit(1);
149.      }
150.      else
151.      {
152.          while(InF.get(ch))
153.          {
154.              in[n] = ch;
155.              n++;
156.          }
157.          InF.close();
```

```
158.      }
159.      return n;
160.  }
161.
162.  void char_to_notearray(note a[][y_max], char in[], int n, int *x, int *y)
163.  {
164.      int xx = 0, yy = 0, maxY = 0;
165.      for ( int i = 0; i < n; i++)
166.      {
167.          if (in[i] == '\n')
168.          {
169.              xx += 1;
170.              yy = 0;
171.          }
172.          else
173.          {
174.              a[xx][yy++].type = in[i];
175.              if(yy > maxY) maxY = yy;
176.          }
177.      }
178.      if (in[n - 1] != '\n') xx++;
179.      *x = xx;
180.      *y = maxY;
181.  }
182.
183.  void printSwitch(int a)
184.  {
185.      /*
186.      ## 0 = 未走過的路                -- 1 = 牆壁
187.      ## 2 = 走過正確的路            -- 3 = 走過錯誤的路
188.      ## + = 體力+50 的食物             -- * = 體力+100 的食物
189.      ## $ = 體力+200 的食物            -- # = 出口
190.      ## + == 43, * == 42, $ == 36
191.      */
192.      switch(a)
193.      {
194.          case '0':  //未走過的路
195.          case 8:    //沒能量
196.              setColor(15);
197.              cout << "  ";
```

```
198.             break;
199.         case '1':  //牆壁
200.             setColor(155);
201.             cout << "■";
202.             setColor(15);
203.             break;
204.         case 9:    //有能量
205.             setColor(200);
206.             cout << "  ";
207.             setColor(15);
208.             break;
209.         case '2':  //走過錯誤的路
210.             setColor(127);
211.             cout << "·";
212.             setColor(15);
213.             break;
214.         case '3':  //走過正確的路
215.             setColor(14);
216.             cout << "·";
217.             setColor(15);
218.             break;
219.         case '+':  //體力+50的食物
220.             setColor(78);
221.             cout << "＋";
222.             setColor(15);
223.             break;
224.         case '*':  //體力+80的食物
225.             setColor(78);
226.             cout << "＊";
227.             setColor(15);
228.             break;
229.         case '$':  //體力+100的食物
230.             setColor(78);
231.             cout << "＄";
232.             setColor(15);
233.             break;
234.         case '#':  //出口
235.             setColor(117);
236.             cout << "＃";
237.             setColor(15);
```

```
238.             break;
239.         case '\n': //換行切換
240.             setColor(15);
241.             cout << "  ";
242.             cout << "\n";
243.             break;
244.         case '@':  //老鼠
245.             setColor(160);
246.             cout << "@";
247.             setColor(15);
248.             break;
249.     }
250. }
251.
252. void print_map(note a[][y_max], int x, int y)
253. {
254.     cout << "迷宮大小 x = " << y << ", y = " << x << endl;
255.     for (int i = 0; i < x; i++)
256.     {
257.         for (int l = 0; l < y; l++)
258.         {
259.             printSwitch(a[i][l].type);
260.         }
261.         setColor(15);
262.         printSwitch('\n');
263.     }
264. }
265.
266. void print_mouse_point(int x)
267. {
268.     gotoxy(7 + x, 0);
269.     if (mouse_point > 0)
270.     {
271.         printf("老鼠目前能量 = %4d ", mouse_point);
272.         int hundreds, tens, n_total;
273.         hundreds = mouse_point / 100;
274.         tens = mouse_point % 100;
275.         if (tens > 50) n_total = hundreds * 2 + 1;
276.         else n_total = hundreds * 2;
277.         for (int i = 0; i < n_total; i++)  printSwitch(9);
```

```
278.          for (int i = 0; i < 11 - n_total; i++) printSwitch(8);
279.      }
280.      else
281.      {
282.          cout << "                                                  ";
283.          cout << "老鼠能量用盡死亡!!!";
284.       }
285.  }
286.
287.  bool not1or3(point p, note a[][y_max])
288.  {
289.      int k = a[p.x][p.y].type;
290.      if(k == '0' || k == '+' || k == '*' || k == '$' || k == '#') return true;
291.      else return false;
292.  }
293.
294.  void foodpoint(point p, note a[][y_max])
295.  {
296.      switch(a[p.x][p.y].type)
297.      {
298.          case '+':
299.              mouse_point += 50;
300.              a[p.x][p.y].type = '3';
301.              break;
302.          case '*':
303.              mouse_point += 80;
304.              a[p.x][p.y].type = '3';
305.              break;
306.          case '$':
307.              mouse_point += 100;
308.              a[p.x][p.y].type = '3';
309.              break;
310.          case '#':
311.              op = 0;
312.              break;
313.          default:
314.              a[p.x][p.y].type = '3';
315.      }
316.  }
317.
```

```
point nextpoint(point now, note a[][y_max])
{
/*
// 老鼠收尋順序  = 東 > 南 > 西 > 北
// 老鼠先判斷是否有下一步路  bool can_go_road
// 如果下一步是食物導入  int food_road return food_point
// 如果往下個方向不能前進，給定 out(-1, -1)
*/
    point out, p;

    if(not1or3(p = {now.x, now.y + 1}, a) == true)
    {
        out.x = now.x;
        out.y = now.y + 1;
        foodpoint(out, a);
    }
    else if (not1or3(p = {now.x + 1, now.y + 1}, a) == true && op4or8 == 8)
    {
        out.x = now.x + 1;
        out.y = now.y + 1;
        foodpoint(out, a);
    }
    else if (not1or3(p = {now.x + 1, now.y}, a) == true)
    {
        out.x = now.x + 1;
        out.y = now.y;
        foodpoint(out, a);
    }
    else if (not1or3(p = {now.x + 1, now.y - 1}, a) == true && op4or8 == 8)
    {
        out.x = now.x + 1;
        out.y = now.y - 1;
        foodpoint(out, a);
    }
    else if (not1or3(p = {now.x, now.y - 1}, a) == true)
    {
        out.x = now.x;
        out.y = now.y - 1;
        foodpoint(out, a);
    }
```

```
358.      else if (not1or3(p = {now.x - 1, now.y - 1}, a) == true && op4or8 == 8)
359.      {
360.          out.x = now.x - 1;
361.          out.y = now.y - 1;
362.          foodpoint(out, a);
363.      }
364.      else if (not1or3(p = {now.x - 1, now.y}, a) == true)
365.      {
366.          out.x = now.x - 1;
367.          out.y = now.y;
368.          foodpoint(out, a);
369.      }
370.      else if (not1or3(p = {now.x - 1, now.y + 1}, a) == true && op4or8 == 8)
371.      {
372.          out.x = now.x - 1;
373.          out.y = now.y + 1;
374.          foodpoint(out, a);
375.      }
376.      else
377.      {
378.          out.x = -1;
379.          out.y = -1;
380.      }
381.      return out;
382.  }
383.
384.  void runtime()
385.  {
386.      switch(mouse_point)
387.      {
388.          case 1 ... 200:
389.              time = timeop * 0.5;
390.              break;
391.          case 201 ... 300:
392.              time = timeop * 0.75;
393.              break;
394.          case 301 ... 400:
395.              time = timeop * 0.8;
396.              break;
397.          case 401 ... 500:
```

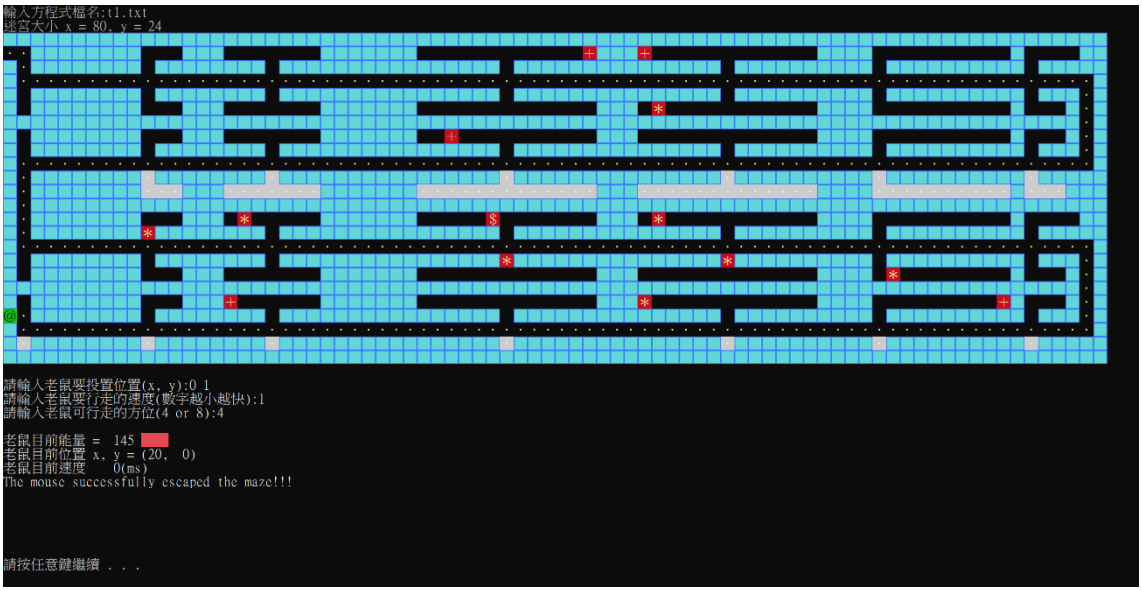
```
398.                 time = timeop;
399.                 break;
400.             case 501 ... 1000:
401.                 time = timeop * 1.5;
402.                 break;
403.             default:
404.                 time = timeop * 0.3;
405.         }
406.     }
407.
408.     bool CheakAll(point p, note a[][y_max])
409.     {
410.         int t;
411.         t = a[p.x][p.y].type;
412.         if (t == '0' || t == '+' || t == '*' || t == '$') return true;
413.         else return false;
414.     }
415.
416.     void mouse_stack(note a[][y_max], int x, int y, int gox, int goy)
417.     {
418.         point next, stack_p[1000];
419.         int top = 0, Exit = 0;
420.         stack_p[top] = {gox, goy};
421.         a[stack_p[top].x][stack_p[top].y].type = '3';
422.         while (Exit == 0 && mouse_point > 0)
423.         {
424.             do
425.             {
426.                 print_mouse_point(x);
427.                 next = nextpoint(stack_p[top], a);
428.                 //先讓上一步路重新顯示
429.                 gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
430.                 printSwitch(a[stack_p[top].x][stack_p[top].y].type);
431.
432.                 gotoxy(8 + x, 0);
433.                 printf("老鼠目前位置 x, y = (%2d, %2d)", stack_p[top].x, stack_p[top].y);
434.
435.                 if (next.x != -1 && next.y != -1)
436.                 {
437.                     //老鼠成功找到下一步，再前往下一步。
```

```
438.
439.                 if (a[stack_p[top].x][stack_p[top].y].type == '2' && op4or8 == 4)
440.                 {
441.                     a[stack_p[top].x][stack_p[top].y].type = '3';
442.                     gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
443.                     printSwitch(a[stack_p[top].x][stack_p[top].y].type);
444.                 }
445.
446.                 if (op4or8 == 8)
447.                 {
448.                     a[stack_p[top].x][stack_p[top].y].type = '3';
449.                     gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
450.                     printSwitch(a[stack_p[top].x][stack_p[top].y].type);
451.                 }
452.
453.                 top++;
454.                 stack_p[top] = next;
455.
456.                 gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
457.                 printSwitch('@');
458.
459.                 if (op == 0)
460.                 {
461.                     mouse_point--;
462.                     Exit = 1;
463.                     break;
464.                 }
465.             }
466.             else if(next.x == -1 && next.y == -1 && top >= 0)
467.             {
468.                 //老鼠找不到下一步路，退到上一步路，並讓目前這部重新顯示錯誤的路 。
469.                 a[stack_p[top].x][stack_p[top].y].type = '2';
470.                 gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
471.                 printSwitch(a[stack_p[top].x][stack_p[top].y].type);
472.
473.                 top--;
474.
475.                 a[stack_p[top].x][stack_p[top].y].type = '2';
476.                 gotoxy(2 + stack_p[top].x, stack_p[top].y * 2);
477.                 printSwitch('@');
```

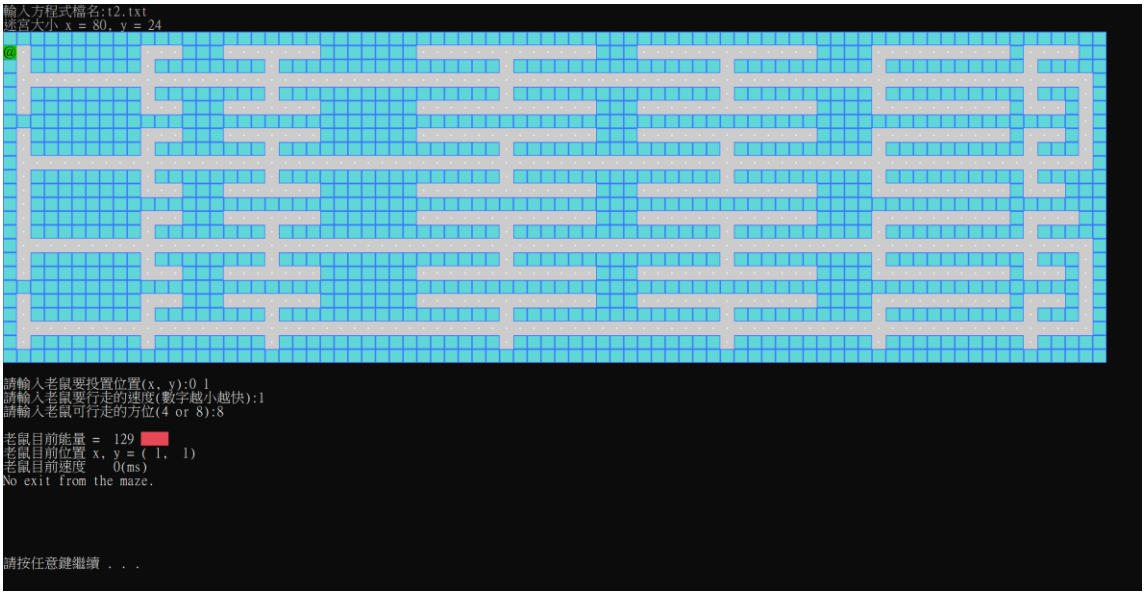
```
478.             }
479.             else
480.             {
481.                 mouse_point--;
482.                 Exit = 1;
483.                 break;
484.             }
485.             runtime();
486.             gotoxy(9 + x, 0);
487.             printf("老鼠目前速度 %4d(ms)", time);
488.             _sleep(time);
489.             mouse_point--;
490.         } while(mouse_point > 0 && top > 0); //判斷老鼠能量
491.
492.         point q;
493.         int k = 0;
494.         if (top == 0)
495.         {
496.             if (CheakAll(q = {stack_p[top].x    , stack_p[top].y + 1}, a)) k = 1;
497.             if (CheakAll(q = {stack_p[top].x + 1, stack_p[top].y    }, a)) k = 1;
498.             if (CheakAll(q = {stack_p[top].x    , stack_p[top].y - 1}, a)) k = 1;
499.             if (CheakAll(q = {stack_p[top].x - 1, stack_p[top].y    }, a)) k = 1;
500.         }
501.         if (top == 0 && op == 8)
502.         {
503.             if (CheakAll(q = {stack_p[top].x + 1, stack_p[top].y + 1}, a)) k = 1;
504.             if (CheakAll(q = {stack_p[top].x + 1, stack_p[top].y - 1}, a)) k = 1;
505.             if (CheakAll(q = {stack_p[top].x - 1, stack_p[top].y - 1}, a)) k = 1;
506.             if (CheakAll(q = {stack_p[top].x - 1, stack_p[top].y + 1}, a)) k = 1;
507.         }
508.         if (top == 0 && k == 0) Exit = 1;
509.     }
510.
511.     //最後結算顯示
512.     if (op == 0 && mouse_point != 0)
513.     {
514.         print_mouse_point(x);
515.         gotoxy(2 + stack_p[top-1].x, stack_p[top-1].y * 2);
516.         printSwitch(a[stack_p[top-1].x][stack_p[top-1].y].type);
517.         gotoxy(8 + x, 0);
```

```
518.            printf("老鼠目前位置 x, y = (%2d, %2d)\n", stack_p[top].x, stack_p[top].y);
519.            gotoxy(10 + x, 0);
520.            cout << "The mouse successfully escaped the maze!!!";
521.        }
522.        if (mouse_point == 0)
523.        {
524.            print_mouse_point(x);
525.        }
526.        if (top <= 0)
527.        {
528.            gotoxy(10 + x, 0);
529.            cout << "No exit from the maze.";
530.        }
531.    }
```

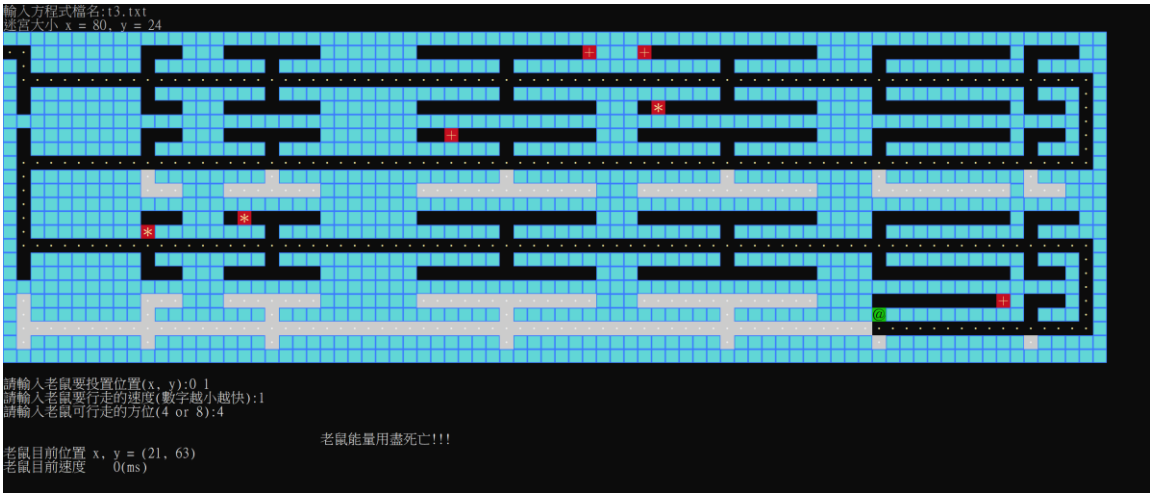
第一類 老鼠成功逃出



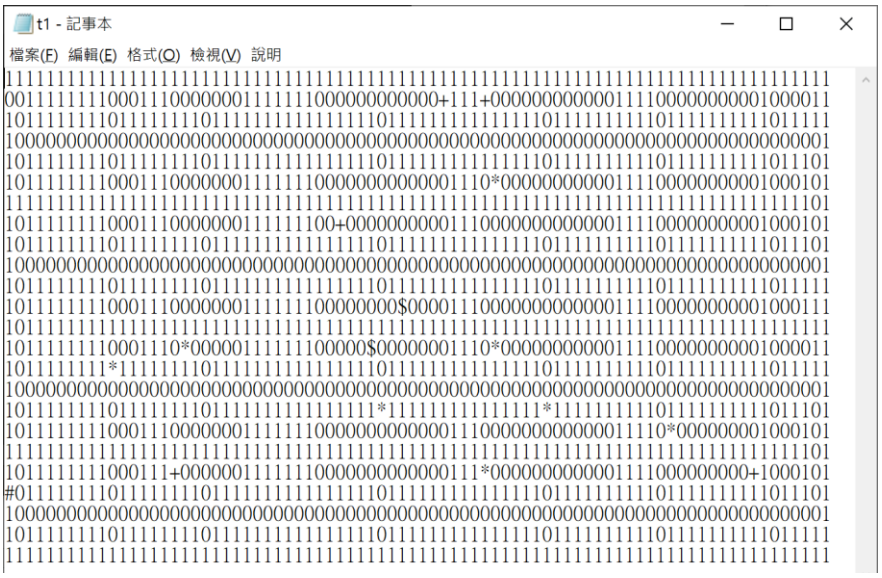
第二類 迷宮無出口



第三類 老鼠餓死



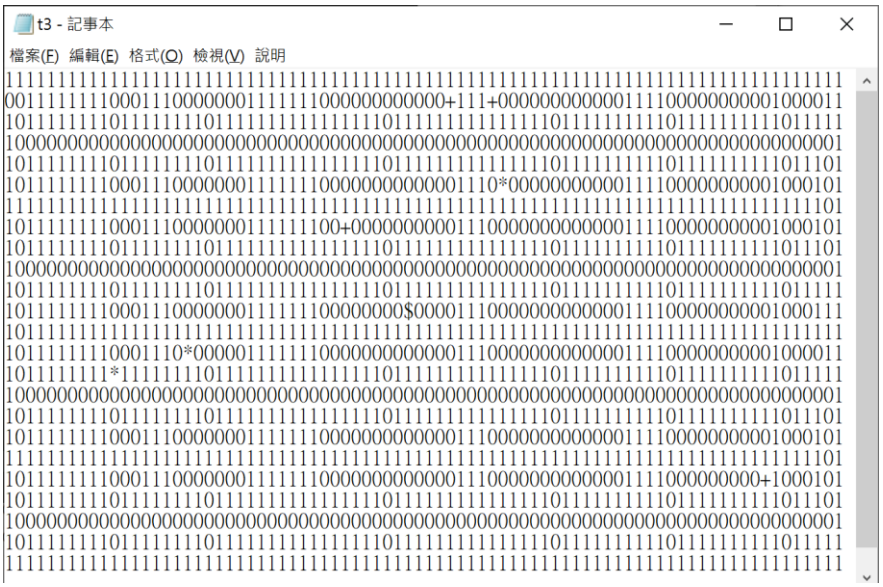
t1


t1 - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

t2


t2 - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

t3


t3 - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

心得

這次的功課對我來說是一種挑戰，首先是要用指定方式完成，必須跳脫以往寫程式的思維方式，便須花更多時間準備，每天打開一下，都會看到須修正的小缺陷，更正所有缺陷讓他達到更加完美，有時是讓冗長的程式縮減，有時則是加些新概念，這作業耗時將近兩個月，在之中真的學習到很多新東西，如還有時間，我期望把她轉換成 GUI 來實作。