

新概念C语言

NCCL – New Concept C Language

@亚嵌李明老师

www.akaedu.org

技术交流QQ群: 279027455

■ 课程资料 <https://github.com/limingth/NCCL/>

Lesson 14 Is there a way out?

判断地图上某点是否有出路

基本概念讲解

- 二维数组
 - 循环和分支
- 逻辑表达式 Logical Expression
 - 或 ||
 - 与 &&
- 随机数生成 Random
 - 时间种子 Time seed

代码

```
#include <stdio.h>
#include <time.h>
#include <stdlib.h>

/* define chessboard size */
#define ROW 10
#define COL 10

/* define chessboard using matrix */
int chessboard[ROW][COL] = { {0} };
```

```
void init(int board[ROW][COL])
{
    int i, j;

    srand(time(NULL));

    for (i = 0; i < ROW; i++)
        for (j = 0; j < COL; j++)
            board[i][j] = rand() % 2;

    return;
}
```

```
/* display chessboard using printf */
void print(int board[ROW][COL])
{
    int i, j;

    printf("\n");
    printf("  ");

    for (j = 0; j < COL; j++)
        printf(" %d", j);
    printf("\n");

    printf(" -");
    for (j = 0; j < COL; j++)
        printf(" -");

    printf("\n");
    for (i = 0; i < ROW; i++) {
        printf("%d| ", i);
```

```
/* test (x, y) is valid before put chess */  
int onboard(int x, int y)  
{  
    if (x >= ROW || x < 0)  
        return 0;  
  
    if (y >= COL || y < 0)  
        return 0;  
  
    return 1;  
}
```

```
int check(int x, int y)
{
    int i = 0;
    int counter = 1;
    int nx, ny;      // next x y

    // up, down, left, right,
    int dirx[4] = { -1, 1, 0, 0 };
    int diry[4] = { 0, 0, -1, 1 };

    counter = 0;

    // 4 directions
    for (i = 0; i < 4; i++)
    {
        nx = x;
        ny = y;
```

```
    nx += dirx[i];
    ny += diry[i];

    // if (nx, ny) is out of board, then continue;
    if (!onboard(nx, ny))
        continue;

    if (chessboard[nx][ny] == 0)
    {
        counter++;
        printf("there is %d direction (%d, %d) out!\n", counter, dirx[
    }
}

return counter;
}
```



```
int main(int argc, char *argv[])
{
    int x = 4, y = 4;
    int ways = 0;

    print(chessboard);
    init(chessboard);
    print(chessboard);

    printf("please input a point position: ");
    scanf("%d %d", &x, &y);
    printf("point(%d, %d)\n", x, y);

    ways = check(x, y);
    printf("Total is %d way out!\n", ways);

    return 0;
}
```

知识点

- 二维数组 `a[] []`
- 随机函数 `rand()`

课堂讨论

- `dirx` 和 `diry` 的数组在代码易读性上是否还有改进的空间？
- 如果在方向判断上，要加上左上，左下，右上，右下这4个方向，如何修改？

课后练习

- 请打印杨辉三角形的前10行。打印输出格式可以参考
<http://baike.baidu.com/view/298289.htm>

- 课程相关信息
 - 课程技术交流QQ群: 275488078 预科2班 qq群号: 279027455
 - 课程多贝主页: <http://www.duobei.com/7402180380>
 - 课程论坛主页: LinkedIn.com 的 NCCL 讨论群组
- 如何搭建环境:
<https://github.com/limingth/NCCL/blob/gh-pages/INSTALL.md>
- 在线网页编程: <http://ideone.com>