Nội dung

Thuật toán đệ quy

**Ví dụ 1**. In ra các bộ 3 số thỏa mãn

* **a1<=a2<=a3**
* Và a1+a2+a3 = 10

Dùng back tracking

Ý tưởng:

|  |
| --- |
| #include <stdio.h>  #define N 100  int n,M,T;  int x[N];  void solution(){  for(int i = 1; i <= n; i++)  printf("%d ",x[i]);  printf("\n");  }  int check(int v, int k){  if(k == n) return T + v == M;  return 1;  }  void Try(int k){  for(int v = 1; v <= M - T - (n-k); v++){  if(check(v,k)){  x[k] = v;  T += v;  if(k == n) solution();  else Try(k+1);  T -= v;  }  }  }  int main(){  n = 3; M = 10; T = 0;  Try(1);  } |

Solution

|  |
| --- |
| #include <stdio.h>  #define N 100  int n,M,T;  int x[N];  void solution(){  for(int i = 1; i <= n; i++)  printf("%d ",x[i]);  printf("\n");  }  int check(int v, int k){  if(k == n) return (T + v == M);  return 1;  }  void Try(int k){  for(int v = 1; v <= M - T - (n-k); v++){  if(check(v,k)){  x[k] = v;  T += v;  if(k<n)Try(k+1);  else if((x[1]<=x[2]) && (x[2]<=x[3])) solution();  T -= v;  }  }  }  int main(){  n = 3; M = 10; T = 0;  Try(1);  } |

**Ví dụ 2**. Nhập vào dãy số gồm n phần tử (n<100). Tìm và in ra các bộ 3 số có tổng bằng K dùng Back tracking

VD. A = {1,2,4,-2,7}

Và K = 7 thì có thể in ra là -2,2,7 hoặc 1,4,2

N= 11, A = {6,3,12,6,-4,17,1,21,4,-2,7} và K =22

|  |
| --- |
| #include<stdio.h>  #include<stdlib.h>  void loadArray(int \*\*A, int \*n)  {  scanf("%d", n);  int \*Arr = (int \*)malloc(sizeof(int)\*(\*n));  for(int i=0; i<\*n; i++)  scanf("%d",&Arr[i]);  \*A = Arr;  }  void printArr(const int \*A, int n)  {  printf("Mang ban dau: ");  for(int i=0; i<n;i++) printf("%d, ",A[i]);  printf("\n");  }    int main()  {  int \*A, n;  loadArray(&A,&n);  printArr(A,n);  free(A);  return 0;  } |

**Nhập vào 5 phần tử: 5 1 2 4 -2 7**

**Bài tập 3.** giải game ô chữ dùng back tracking

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A** | **S** | **S** | **H** | **S** | **W** | **E** | **E** | **M** | **T** |
| **M** | **H** | **S** | **U** | **N** | **D** | **A** | **Y** | **I** | **H** |
| **S** | **T** | **A** | **S** | **U** | **N** | **B** | **S** | **R** | **G** |
| **A** | **S** | **S** | **T** | **A** | **B** | **L** | **E** | **R** | **E** |
| **T** | **T** | **S** | **A** | **T** | **G** | **N** | **M** | **O** | **N** |
| **S** | **T** | **A** | **B** | **L** | **E** | **O** | **N** | **R** | **M** |
| **M** | **O** | **R** | **L** | **S** | **N** | **E** | **R** | **M** | **I** |

**HAT, TABLE, STUDENT, MONITOR, MIRROR, STABLE, SUNDAY, NEED, USB**

Tìm càng nhiều từ càng tốt

Hướng chéo, lên, xuống từ trái sang phải hoặc từ trên xuống dưới

**Bài tập 1**. Một công ty yêu cầu nhân viên khi ra và vào đều phải quẹt thẻ. Dữ liệu thẻ quẹt trong ngày sẽ được tổng hợp lại và xử lý vào cuối ngày.

Dữ liệu thẻ quẹt dạng file text như sau

|  |
| --- |
| 12132 IN 08:15:12  12132 OUT 08:25:02  13132 IN 08:25:22  12032 IN 08:35:12  13132 OUT 08:45:12  12132 OUT 12:01:03  13132 OUT 12:21:33  12132 IN 12:41:03  12032 OUT 13:01:33  13132 IN 13:21:33  12032 IN 13:51:53  ### |

**scanf(“%d %s %d:%d:%d”,….)**

Trong đó IN và quẹt để vào và OUT là ra

Dữ liệu log được lấy theo thời gian tăng dần

Số đầu tiên (gồm 5 chữ số) là mã thẻ của nhân viên

Cuối file log sẽ là ###

Dựa vào dữ liệu LOG đã có hãy thống kê xem

* Ngày hiện tại đang có bao nhiêu người đi làm
* Ai là người ngồi trong văn phòng nhiều nhất và ai là người ra ngoài nhiều nhất (theo tổng thời gian)
* Ai là người về sớm nhất (theo thời gian)
* Giả sử công ty yêu cầu thời gian làm việc là sáng 8:30:00 tới 12:00:00 và chiều từ 13:30:00 tới 17:00:00. Hãy in ra xem những nhân viên nào không tuân thủ về thời gian (vào muộn và về sớm)?

**Bài tập 2**. Cho đầu vào là ảnh nhị phân dạng

|  |
| --- |
| 20 30  1 1 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1  1 1 0 1 1 1 1 1 1 1 0 1 1 0 0 0 1 1 1 1 1 0 1 1 1 1 1 1 1 1  1 1 0 1 1 1 1 1 1 0 1 1 1 1 1 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1  1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 1 1 1 1 0 1 1 1 0 1 1 1  1 1 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 0 1 1 1 1 1 1 1  0 0 0 0 1 1 1 1 0 1 1 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1  1 1 0 1 1 1 1 1 1 0 0 0 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 0 1 0 0 0 0 0 0 0  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 0 0 1 1 1 1 1 1  1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 1 1 1 1 1 1 1  1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1 1 1 1 1 1 1 1  1 1 0 1 0 1 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  0 1 1 1 1 1 1 0 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 0 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  1 1 1 1 0 1 1 1 1 1 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  1 1 1 0 1 1 1 1 1 1 1 1 1 0 1 0 1 1 1 0 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |

Hãy đếm số lượng vùng ảnh trong ảnh ban đầu và in ra diện tích vùng ảnh lớn nhất/nhỏ nhất

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| 68 120 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000111000000000000000000  000000000000000011100000000000000000000000000000000000000000000000000000000000000000000000000011111111100000001000000000  000000000000001111110000000000000000000000000000000000000000000000000000000000000000000000001111111110000100001000000000  000000000000011111111000000000000000000000011110000000000000000000000000000000000000000000000111111110000100011000000000  000000000000111111111100000000000000000001111111100000000000000000000000000000000000000001110111111111100100111100000000  000000000001111111111111000000000000000011111111100000000000000000000000000000000000000001110111111111111111111100000000  000000000011111111111111100000000000011111111111000111110000000000000000000000000000000000011111111111111111111100000000  000000001111111111111111100000000000000011111000111111110000000000000000000000000000000000001111111111111111111000000000  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