Ex. No.: 9
Date: 27-04-2024

DEADLOCK AVOIDANCE

Aim:

To find out a safe sequence using Banker’s algorithm for deadlock avoidance.

Algorithm:

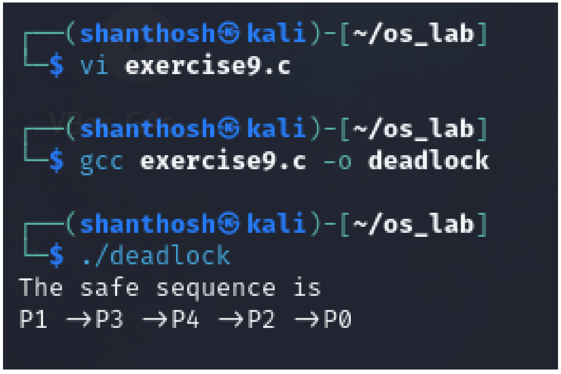
```
1. Initialize work=available and finish[i]=false for all values of i 2. Find
an i such that both:
     finish[i]=false and Need_i <= work
3. If no such i exists go to step 6
4. Compute work=work+allocation_i
5. Assign finish[i] to true and go to step 2
6. If finish[i]==true for all i, then print safe sequence
7. Else print there is no safe sequence
```

Program Code:

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
int main()
{
      int n = 5, m = 3, i, j ,k;
      int alloc[5][3] = {{0,1,0},{2,0,0},{3,0,2},{2,1,1},{0,0,2}};
      int max[5][3]={{7,5,3},{3,2,2},{9,0,2},{2,2,2},{4,3,3}};
      int avail[3] = {3,2,2};
      int f[n], ans[n], ind = 0;
      memset(f,'\0', n);
      int need[n][m];
      for(i = 0; i < n ;i++){
            for(j = 0; j < m; j++){
                  need[i][j] = max[i][j]-alloc[i][j];
            }
      }
      int y = 0;
      for(k=0;k<5;k++){
            for(i = 0; i < n; i++){
                  if(f[i]==0){
                        int flag=0;
                        for(j=0;j<m;j++){
                              if(need[i][j]>avail[j]){
                                    flag=1;
                                    break;
                              }
                        }
                        if(flag==0){
```

```
                    ans[ind++]=i;
                    for(y=0;y<m;y++){
                        avail[y]+= alloc[i][y];
                    }
                    f[i]=1;
                }
            }
        }
    }
    printf("The safe sequence is \n");
    for(i = 0; i < n - 1; i++){
        printf("P%d ->", ans[i]);
    }
    printf("P%d", ans[n-1]);
    return 0;
}
```

Output:



```
┌──(shanthosh㉿kali)-[~/os_lab]
└─$ vi exercise9.c

┌──(shanthosh㉿kali)-[~/os_lab]
└─$ gcc exercise9.c -o deadlock

┌──(shanthosh㉿kali)-[~/os_lab]
└─$ ./deadlock
The safe sequence is
P1 →P3 →P4 →P2 →P0
```

Result:

Hence the C program to find out a safe sequence using Banker’s algorithm for deadlock avoidance has been successfully completed and executed