PROGRAM – 7

AIM: To implement Banker's Algorithm

INTRODUCTION: The Banker's Algorithm is a resource allocation and deadlock avoidance algorithm that tests for safety by simulating the allocation for predetermined maximum possible amounts of all resources, then makes an "s-state" check to test for possible activities, before deciding whether allocation should be allowed to continue. It consists of a safety algorithm which is used for finding out whether or not a system is in safe state. In the following program, we have tried to implement the Banker's Algorithm in C++ on linux.

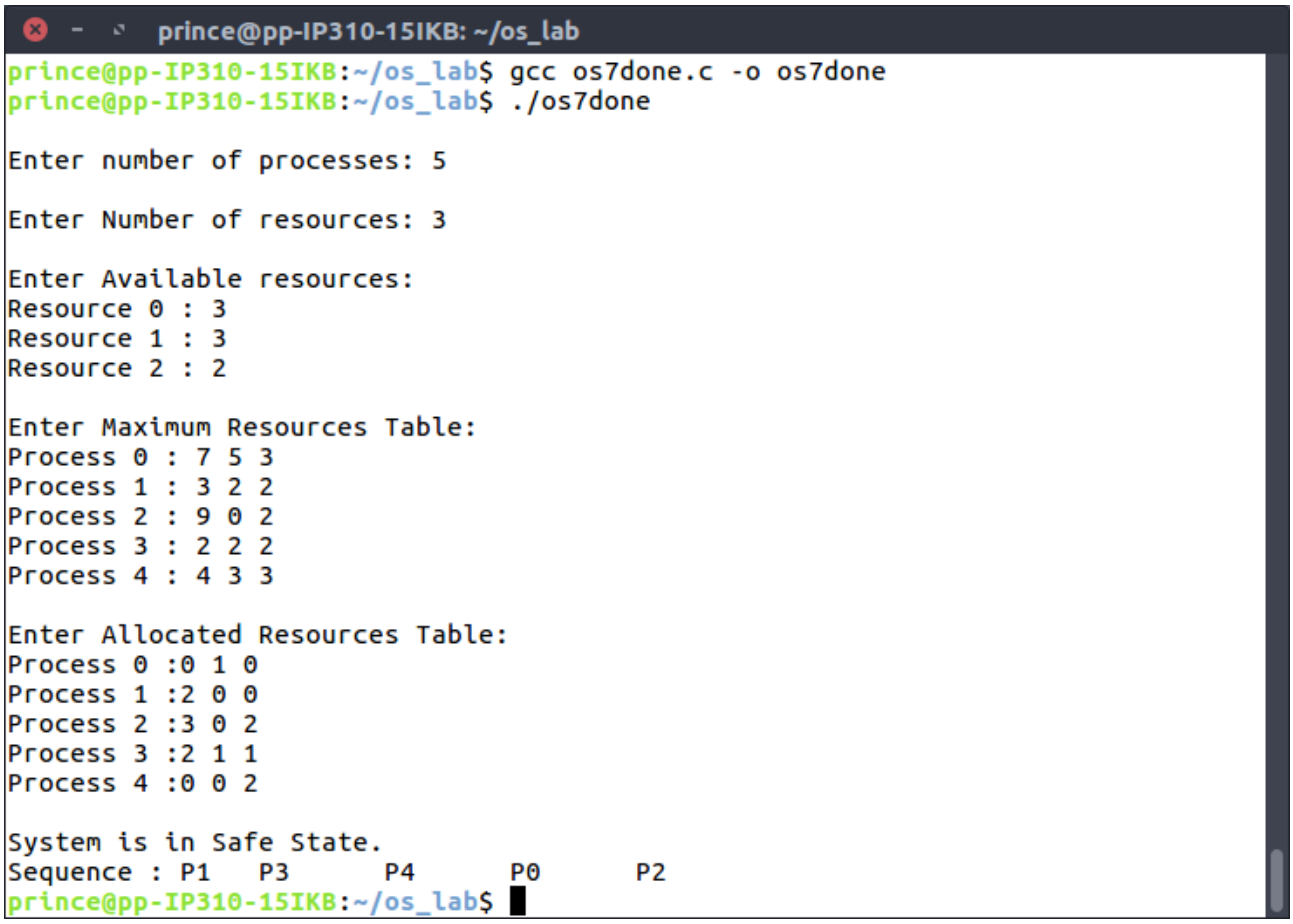
C PROGRAM :

```
#include <stdio.h>

int current[5][5], maximum_claim[5][5], available[5];
int processes,resources;
int need[5][5];
int counter = 0, i, j, k;
int seq[5];

void isSafe(){
   for (i = 0; i < processes; ++i){
      for (int j = 0; j < resources; ++j){
         need[i][j] = maximum_claim[i][j] - current[i][j];
      }
   }

   int finish[i];
   for (i = 0; i < processes; ++i)
      finish[i] = 0;

   int work[resources];
   for (i = 0; i < resources; ++i)
      work[i] = available[i];
```

```
  while(counter< processes){
        int p;
        int found = 0;
        for (p = 0; p < processes; ++p){
            if(finish[p] == 0){
                for ( j = 0; j < resources; ++j){
                    if (need[p][j]>work[j]){
                        break;
                    }
                }
                if (j == resources){
                    for ( k = 0; k < resources; ++k){
                        work[k] += current[p][k];
                    }

                    seq[counter] = p;
                    counter +=1;
                    finish[p] = 1;
                    found = 1;
                }
            }
        }

        if (found == 0){
            printf("\nSystem is Not in Safe State...");
            return;
        }
    }

    printf("\nSystem is in Safe State. \nSequence : ");

    for (int i = 0; i < processes; ++i){
        printf("P%d\t", seq[i] );
    }

    printf("\n");

}
```

```
int main(){

    printf("\nEnter number of processes: ");
        scanf("%d", &processes);

    printf("\nEnter Number of resources: ");
        scanf("%d", &resources);

    printf("\nEnter Available resources:\n");
    for (i = 0; i < resources; i++) {
        printf("Resource %d : ",i);
        scanf("%d", &available[i]);
    }

    printf("\nEnter Maximum Resources Table:\n");
    for (i = 0; i < processes; i++) {
        printf("Process %d : ",i );
        for(j = 0; j < resources; j++) {
                scanf("%d", &maximum_claim[i][j]);
        }
    }

    printf("\nEnter Allocated Resources Table:\n");
    for (i = 0; i < processes; i++){
        printf("Process %d :", i );
        for(j = 0; j < resources; j++) {
          scanf("%d", &current[i][j]);
        }
    }

    isSafe();

    return 0;
}
```

OUTPUT:



LEARNING OUTCOMES

Through the above program, we learnt about the Banker's Algorithm and how it can be implemented to find out whether a system is in a safe state or not given the various parameters associated with the allocation and need of the resources.