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CHENNAI

SWE3001 – Operating Systems Laboratory Manual

Lab - 07

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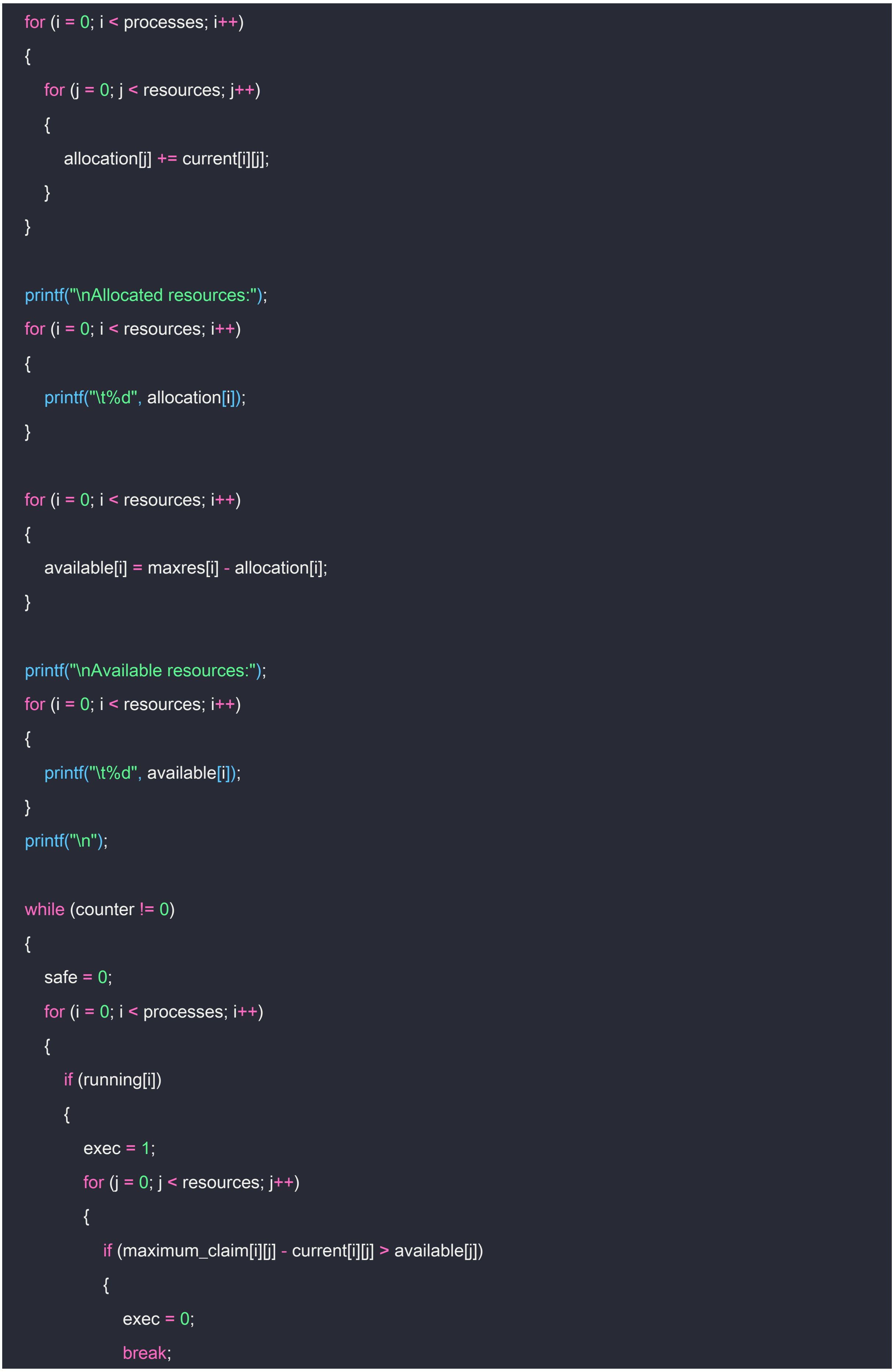
SWE3001 – Operating Systems

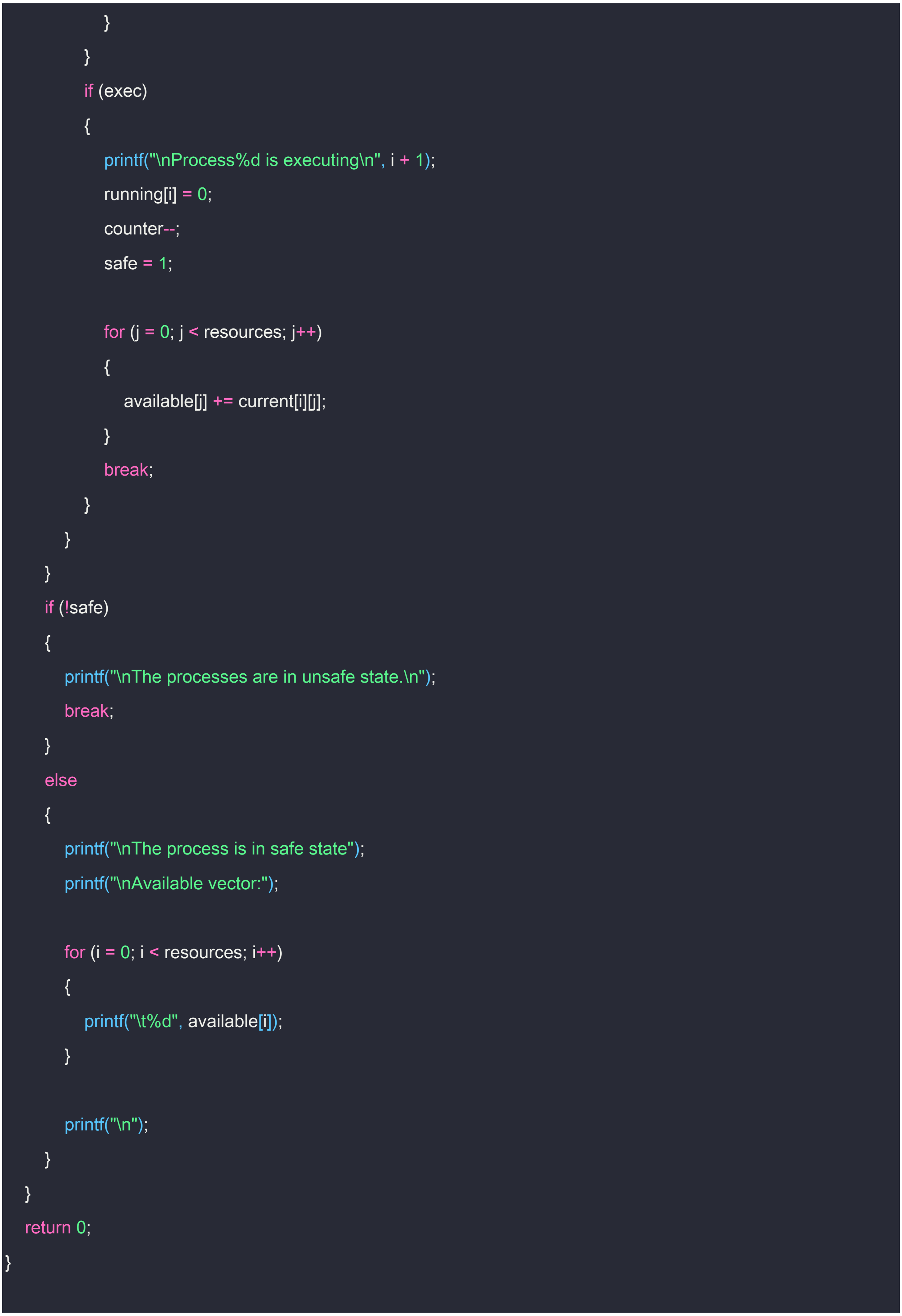
Lab – 07 – Banker’s Algorithm

Design a banker's algorithm for process management in a operating system.

```
#include <stdio.h>

    int current[5][5],
    maximum_claim[5][5], available[5];
int allocation[5] = {0, 0, 0, 0, 0};
int maxres[5], running[5], safe = 0;
int counter = 0, i, j, exec, resources, processes, k = 1;

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

    for (i = 0; i < processes; i++)
    {
        running[i] = 1;
        counter++;
    }

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

    printf("\nEnter Claim Vector:");
    for (i = 0; i < resources; i++)
    {
        scanf("%d", &maxres[i]);
    }

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

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

printf("\nThe Claim Vector is: ");
for (i = 0; i < resources; i++)
{
    printf("\t%d", maxres[i]);
}

printf("\nThe Allocated Resource Table:\n");
for (i = 0; i < processes; i++)
{
    for (j = 0; j < resources; j++)
    {
        printf("\t%d", current[i][j]);
    }
    printf("\n");
}

printf("\nThe Maximum Claim Table:\n");
for (i = 0; i < processes; i++)
{
    for (j = 0; j < resources; j++)
    {
        printf("\t%d", maximum_claim[i][j]);
    }
    printf("\n");
}
```

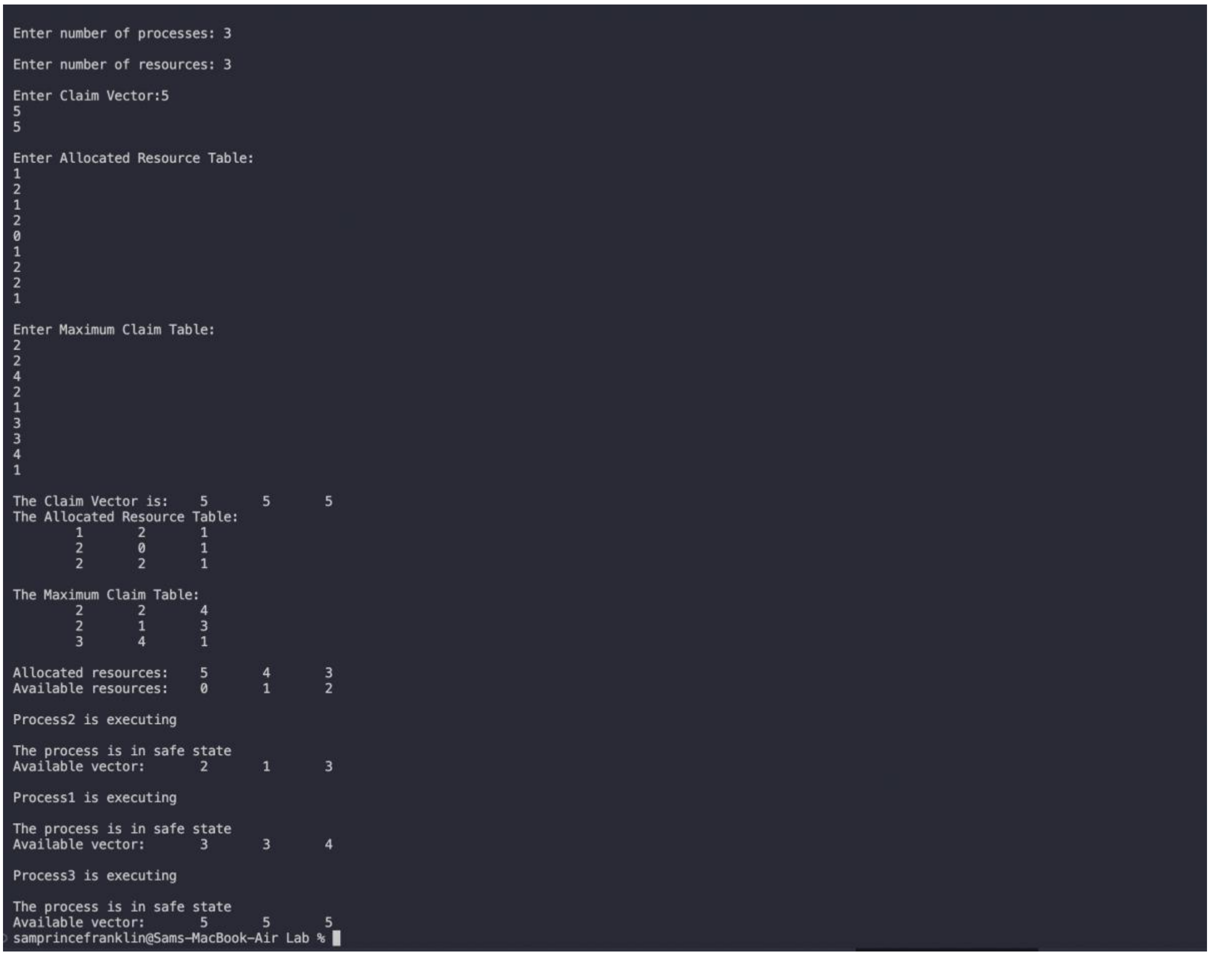


```
for (i = 0; i < processes; i++)
{
    for (j = 0; j < resources; j++)
    {
        allocation[j] += current[i][j];
    }
}

printf("\nAllocated resources:");
for (i = 0; i < resources; i++)
{
    printf("\t%d", allocation[i]);
}

for (i = 0; i < resources; i++)
{
    available[i] = maxres[i] - allocation[i];
}

printf("\nAvailable resources:");
for (i = 0; i < resources; i++)
{
    printf("\t%d", available[i]);
}
printf("\n");

while (counter != 0)
{
    safe = 0;
    for (i = 0; i < processes; i++)
    {
        if (running[i])
        {
            exec = 1;
            for (j = 0; j < resources; j++)
            {
                if (maximum_claim[i][j] - current[i][j] > available[j])
                {
                    exec = 0;
                    break;
```



```
                    }
                }
                if (exec)
                {
                    printf("\nProcess%d is executing\n", i + 1);
                    running[i] = 0;
                    counter--;
                    safe = 1;

                    for (j = 0; j < resources; j++)
                    {
                        available[j] += current[i][j];
                    }
                    break;
                }
            }
        }
        if (!safe)
        {
            printf("\nThe processes are in unsafe state.\n");
            break;
        }
        else
        {
            printf("\nThe process is in safe state");
            printf("\nAvailable vector:");

            for (i = 0; i < resources; i++)
            {
                printf("\t%d", available[i]);
            }

            printf("\n");
        }
    }
    return 0;
}
```

Output :



```
Enter number of processes: 3

Enter number of resources: 3

Enter Claim Vector:5
5
5

Enter Allocated Resource Table:
1
2
1
2
0
1
2
2
1

Enter Maximum Claim Table:
2
2
4
2
1
3
3
4
1

The Claim Vector is:    5       5       5
The Allocated Resource Table:
        1       2       1
        2       0       1
        2       2       1

The Maximum Claim Table:
        2       2       4
        2       1       3
        3       4       1

Allocated resources:    5       4       3
Available resources:    0       1       2

Process2 is executing

The process is in safe state
Available vector:       2       1       3

Process1 is executing

The process is in safe state
Available vector:       3       3       4

Process3 is executing

The process is in safe state
Available vector:       5       5       5
samprincefranklin@Sams-MacBook-Air Lab % 
```