Week 3

Write a C program to simulate multi-level queue scheduling algorithm considering the following scenario. All the processes in the system are divided into two categories – system processes and user processes. System processes are to be given higher priority than user processes. Use FCFS scheduling for the processes in each queue.

Multilevel

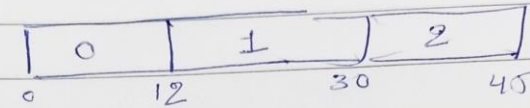
```
#include <stdio.h>
int main()
{
    int p[20], bt[20], su[20], wt[20], tat[20], i, k, n,
                                        temp;
    float wtavg, tatavg;
    printf("Enter the number of processes:");
    scanf("%d", &n);
    for(i=0; i<n; i++)
    {
        p[i] = i;
        printf("Enter the Burst time of process %d:", i
        scanf("%d", &bt[i]);
        printf("System/user process (0/1)?");
        scanf("%d", &su[i]);
    }
    for(i=0; i<n; i++)
        for(k=i+1; k<n; k++)
            if(su[i] > su[k])
            {
                temp = p[i];
                p[i] = p[k];
                p[k] = temp;
                temp = bt[i];
                bt[i] = bt[k];
                bt[k] = temp;
                temp = su[i];
                su[i] = su[k];
                su[k] = temp;
            }
    wtavg = wt[0] = 0;
    tatavg = tat[0] = bt[0];
    for(i=1; i<n; i++)
    {
        wt[i] = wt[i-1] + bt[i-1];
        tat[i] = tat[i-1] + bt[i];
        wtavg = wtavg + wt[i];
        tatavg = tatavg + tat[i];
    }
    printf("\nProcess \t\t System User process \t Burst
        time \t Waiting time \t Turnaround time");
    for(i=0; i<n; i++)
        printf("\n%d \t\t %d \t\t %d \t\t %d \t\t %d",
            p[i], su[i], bt[i], wt[i], tat[i]);
    printf("\n Average waiting Time is --- %f",
                wtavg/n);
    printf("\n Average Turnaround Time is --- %f",
                tatavg/n);
    return 0;
}
```

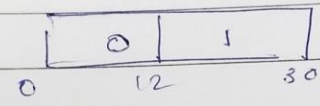
Output

```
enter the no. of processes: 3
enter the burst time of process 0 : 12
System /user process (0/1) ? 0
Enter the burst time of process 1 : 18
System /user Process (0/1) ? 0
Enter the Burst Time of process 2 : 15
System/user process (0/1) ? 1
```

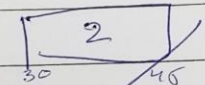
Process	System/user	Burst time	Waiting Time	Turnaround
0	0	12	0	12
1	0	18	12	30
2	1	15	30	45

Average waiting Time is --- 14.0000
Average Turnaround time is --- 29.000





- System



- User.

Late

19/7/2023

Write a C program to simulate Real-Time CPU Scheduling algorithms:

a) Rate- Monotonic

Week-4

Rate monotonic

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

int gcd(int a, int b)
{
    if(b==0)
        return a;
    else
        gcd(b, a%b);
}
int lcm(int a, int b)
{
    return((a*b)/gcd(a,b));
}
int hyperperiod(int period[], int n)
{
    int k = period[0];
    n--;
    while(n>=1)
    {
        k = lcm(k, period[n--]);
    }
    return k;
}

int main()
{
    int period[10], cput[10], n, i, temp, hyp;

    printf("Enter no. of processes:\n");
    scanf("%d", &n);

    printf("Enter period and processing time:\n");
    for(i=0; i<n; i++)
    {
        scanf("%d %d", &period[i], &cput[i]);
    }

    hyp = hyperperiod(period, n);
    printf("Hyperperiod = %d\n", hyp);
    int util[10];
    float utilization = 0;
```

```
    for(i=0; i<n; i++)
    {
        util[i] = hyp / period[i];
        util[i] = cput[i];
        utilization += util[i];
        printf("util %d: %d\n", i, util[i]);
    }
    utilization /= hyp;
    printf("Utilization = %f\n", utilization);
    return 0;
}
```

Output

```
Enter no. of processes
3
Enter period and processing time
20 3
5 2
10 2
```

hyperperiod := 20

Utilization = 0.75000