OPERATING SYSTEMS

LAB ASSIGNMENT 5

Creating C programs for different scheduling algorithms

Q. Create and execute C programs for following CPU Scheduling Algorithms:

1. First Come First Serve (FCFS)

```
#include <stdio.h>
int main() {
    int n, i;
    int bt[20], wt[20], tat[20];
    float avg_wt = 0, avg_tat = 0;

    printf("Enter total number of processes: ");
    scanf("%d", &n);

    printf("Enter burst time for each process:\n");
    for(i = 0; i < n; i++) {
        printf("P[%d]: ", i+1);
        scanf("%d", &bt[i]);
    }

    wt[0] = 0;

    for(i = 1; i < n; i++) {
        wt[i] = 0;
        for(int j = 0; j < i; j++)
            wt[i] += bt[j];
    }
```

```
    printf("\nProcess\tBT\tWT\tTAT");
    for(i = 0; i < n; i++) {
        tat[i] = bt[i] + wt[i];
        avg_wt += wt[i];
        avg_tat += tat[i];
        printf("\nP[%d]\t%d\t%d\t%d", i+1, bt[i], wt[i], tat[i]);
    }

    avg_wt /= n;
    avg_tat /= n;
    printf("\n\nAverage Waiting Time: %.2f", avg_wt);
    printf("\nAverage Turnaround Time: %.2f\n", avg_tat);
    return 0;
}
```

Output:

Enter total number of processes: 4

Enter burst time for each process:

P[1]: 5

P[2]: 3

P[3]: 8

P[4]: 6

Process	BT	WT	TAT
P[1]	5	0	5
P[2]	3	5	8
P[3]	8	8	16
P[4]	6	16	22

Average Waiting Time: 7.25

Average Turnaround Time: 12.75

2. Shortest Job First (SJF)

```
#include <stdio.h>

int main() {
    int n, bt[20], p[20], wt[20], tat[20], i, j, temp;
    float avg_wt = 0, avg_tat = 0;

    printf("Enter number of processes: ");
    scanf("%d", &n);

    printf("Enter burst time for each process:\n");
    for(i = 0; i < n; i++) {
        printf("P[%d]: ", i+1);
        scanf("%d", &bt[i]);
        p[i] = i+1;
    }

    for(i = 0; i < n-1; i++) {
        for(j = i+1; j < n; j++) {
            if(bt[i] > bt[j]) {
                temp = bt[i]; bt[i] = bt[j]; bt[j] = temp;
                temp = p[i]; p[i] = p[j]; p[j] = temp;
            }
        }
    }

    wt[0] = 0;
```

```
    for(i = 1; i < n; i++) {
        wt[i] = 0;
        for(j = 0; j < i; j++)
            wt[i] += bt[j];
    }

    printf("\nProcess\tBT\tWT\tTAT");
    for(i = 0; i < n; i++) {
        tat[i] = bt[i] + wt[i];
        avg_wt += wt[i];
        avg_tat += tat[i];
        printf("\nP[%d]\t%d\t%d\t%d", p[i], bt[i], wt[i], tat[i]);
    }

    avg_wt /= n;
    avg_tat /= n;
    printf("\n\nAverage Waiting Time: %.2f", avg_wt);
    printf("\nAverage Turnaround Time: %.2f\n", avg_tat);
    return 0;
}
```

Output:

```
Enter number of processes: 4
Enter burst time for each process:
P[1]: 6
P[2]: 8
P[3]: 7
P[4]: 3

Process         BT      WT      TAT
P[4]             3       0       3
```

P[1]	6	3	9
P[3]	7	9	16
P[2]	8	16	24

Average Waiting Time: 7.00

Average Turnaround Time: 13.00

3. Round Robin Scheduling

```
#include <stdio.h>

int main() {
    int i, n, time, remain, tq;
    int bt[10], rt[10], wt[10] = {0}, tat[10] = {0};
    int flag = 0;
    float avg_wt = 0, avg_tat = 0;

    printf("Enter number of processes: ");
    scanf("%d", &n);
    remain = n;

    printf("Enter burst time for each process:\n");
    for(i = 0; i < n; i++) {
        printf("P[%d]: ", i+1);
        scanf("%d", &bt[i]);
        rt[i] = bt[i];
    }

    printf("Enter Time Quantum: ");
    scanf("%d", &tq);
```

```
for(time = 0, i = 0; remain != 0; ) {
    if(rt[i] > 0 && rt[i] <= tq) {
        time += rt[i];
        rt[i] = 0;
        flag = 1;
    } else if(rt[i] > 0) {
        rt[i] -= tq;
        time += tq;
    }

    if(flag == 1 && rt[i] == 0) {
        remain--;
        tat[i] = time;
        wt[i] = tat[i] - bt[i];
        avg_wt += wt[i];
        avg_tat += tat[i];
        flag = 0;
    }

    i = (i + 1) % n;
}

printf("\nProcess\tBT\tWT\tTAT");
for(i = 0; i < n; i++)
    printf("\nP[%d]\t%d\t%d\t%d", i+1, bt[i], wt[i], tat[i]);

printf("\n\nAverage Waiting Time: %.2f", avg_wt/n);
printf("\nAverage Turnaround Time: %.2f\n", avg_tat/n);
return 0;
```

```
}
```

Output:

Enter number of processes: 4

Enter burst time for each process:

P[1]: 5

P[2]: 15

P[3]: 4

P[4]: 3

Enter Time Quantum: 4

Process	BT	WT	TAT
P[1]	5	6	11
P[2]	15	18	33
P[3]	4	4	8
P[4]	3	0	3

Average Waiting Time: 7.00

Average Turnaround Time: 13.75