NEW SJF

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

typedef struct {
    char pname[20];
    int at, bt, ct, tat, wt;
    int bt1;
} Process;

typedef struct {
    int start;
    char pname[20];
    int end;
} Gantt;

Process processes[10];
Gantt ganttChart[100];
int processCount, ganttIndex = 0;

void addToGanttChart(int start, int end, char pname[]) {
    ganttChart[ganttIndex]×start = start;
    ganttChart[ganttIndex].end = end;
    strcpy(ganttChart[ganttIndex].pname, pname);
    ganttIndex++;
}

void printGanttChart() {
    printf("\nGantt Chart:\n");
    for (int i = 0; i < ganttIndex; i++) {
        printf("| %s ", ganttChart[i].pname);
    }
    printf("|\n");

    for (int i = 0; i < ganttIndex; i++) {
        printf("%d    ", ganttChart[i].start);
    }
```

```
    printf("%d\n", ganttChart[ganttIndex - 1].end);
}

void acceptProcessInfo() {
    printf("Enter the number of processes: ");
    scanf("%d", &processCount);
    for (int i = 0; i < processCount; i++) {
        printf("Enter process name: ");
        scanf("%s", processes[i].pname);
        printf("Enter arrival time: ");
        scanf("%d", &processes[i].at);
        printf("Enter burst time: ");
        scanf("%d", &processes[i].bt);
        processes[i]×bt1 = processes[i].bt;
    }
}

void sortProcessesByArrival() {
    for (int i = 0; i < processCount - 1; i++) {
        for (int j = i + 1; j < processCount; j++) {
            if (processes[i].at > processes[j].at) {
                Process temp = processes[i];
                processes[i] = processes[j];
                processes[j] = temp;
            }
        }
    }
}

int getShortestJob(int time) {
    int minIndex = -1;
    int minBurstTime = 9999;  // Initialize to a large number

    for (int i = 0; i < processCount; i++) {
        if (processes[i].at <= time && processes[i].bt1 > 0) {
            if (processes[i].bt1 < minBurstTime) {
                minBurstTime = processes[i].bt1;
                minIndex = i;
            }
        }
    }
    return minIndex;
}
```

```
void sjfScheduling() {
    int time = 0;
    int completed = 0;

    while (completed < processCount) {
        int sjIndex = getShortestJob(time);
        if (sjIndex == -1) {
            time++;  // CPU is idle
        } else {
            addToGanttChart(time, time + processes[sjIndex].bt1,
processes[sjIndex].pname);
            processes[sjIndex]×ct = time + processes[sjIndex].bt1;
            time = processes[sjIndex].ct;
            processes[sjIndex]×bt1 = 0;  // Process completed
            completed++;
        }
    }
}

void calculateTATandWT() {
    for (int i = 0; i < processCount; i++) {
        processes[i]×tat = processes[i].ct - processes[i].at;
        processes[i]×wt = processes[i].tat - processes[i].bt;
    }
}

void displayResults() {
    printf("\nProcess\tAT\tBT\tCT\tTAT\tWT\n");
    for (int i = 0; i < processCount; i++) {
        printf("%s\t%d\t%d\t%d\t%d\t%d\n",
               processes[i].pname, processes[i].at, processes[i].bt,
               processes[i].ct, processes[i].tat, processes[i].wt);
    }
}

void calculateAndPrintAverages() {
    float totalTAT = 0, totalWT = 0;
    for (int i = 0; i < processCount; i++) {
        totalTAT += processes[i].tat;
        totalWT += processes[i].wt;
    }
    printf("Average Turnaround Time: %.2f\n", totalTAT / processCount);
    printf("Average Waiting Time: %.2f\n", totalWT / processCount);
}
```

```
int main() {
    acceptProcessInfo();
    sortProcessesByArrival();
    sjfScheduling();
    calculateTATandWT();
    displayResults();
    printGanttChart();  // Print Gantt chart
    calculateAndPrintAverages();
    return 0;
}
```