Innovative Assignment

Roll No Name

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Course Code and Subject: 2CS403 Operating Systems

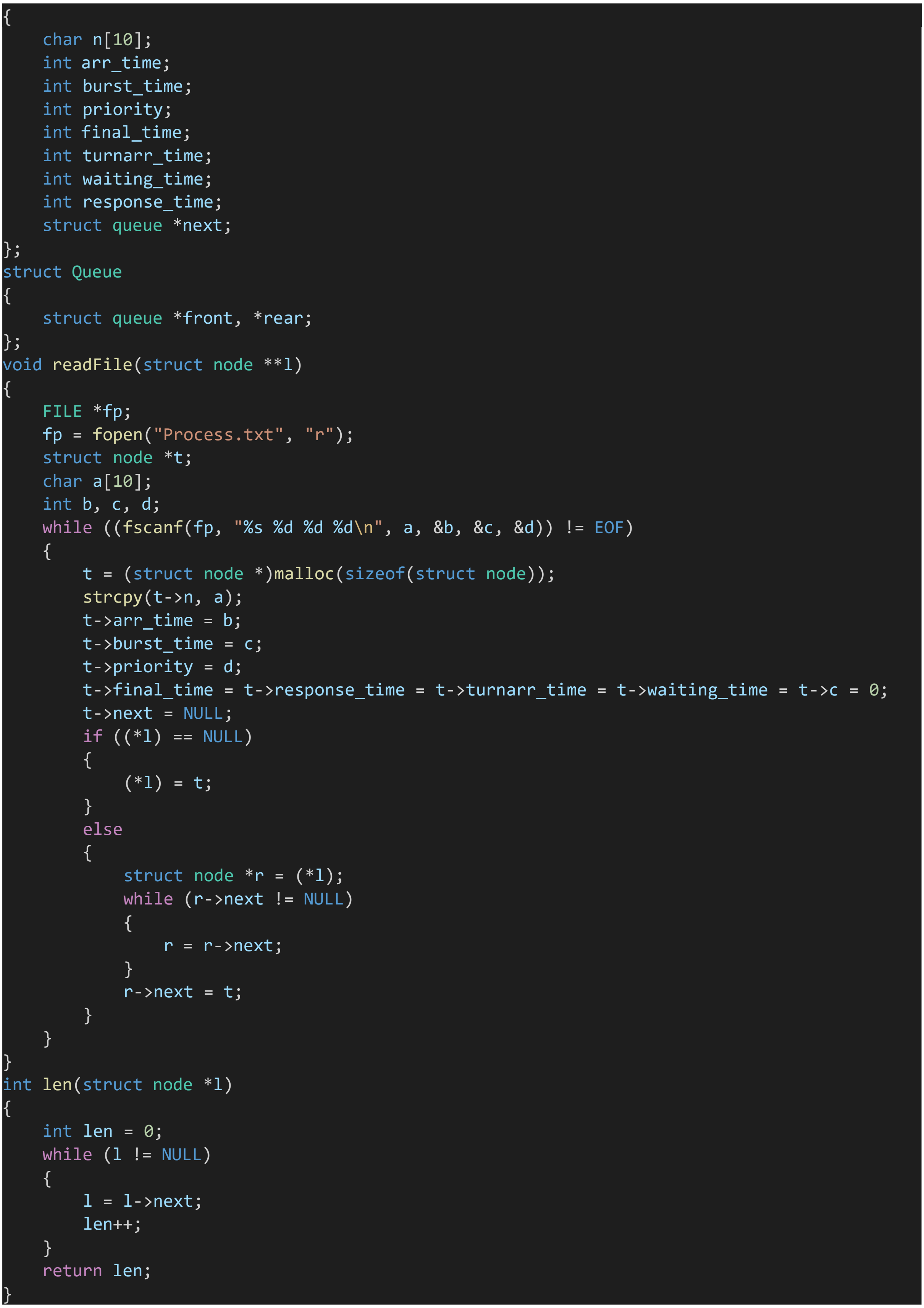
Definition: Write a single menu driven C program to simulate the following CPU scheduling algorithms to find turnaround time and waiting time.
a) First-Come First-Served
b) Shortest Job First
c) Round Robin Scheduling
d) Priority Scheduling
e) Shortest Remaining Time First
f) Longest remaining time first

Code:

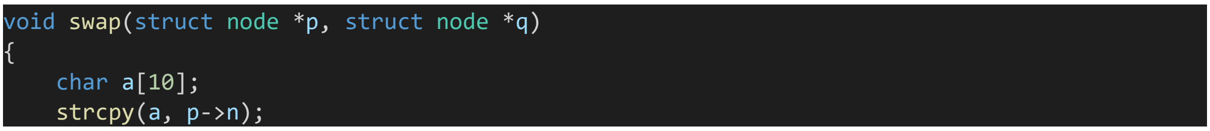
```c
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <string.h>

struct node
{
    char n[10];
    int arr_time;
    int burst_time;
    int priority;
    int final_time;
    int turnarr_time;
    int waiting_time;
    int response_time;
    int c;
    struct node *next;
};
```

```c
struct Node
{
    char n[10];
    struct Node *next;
};
```

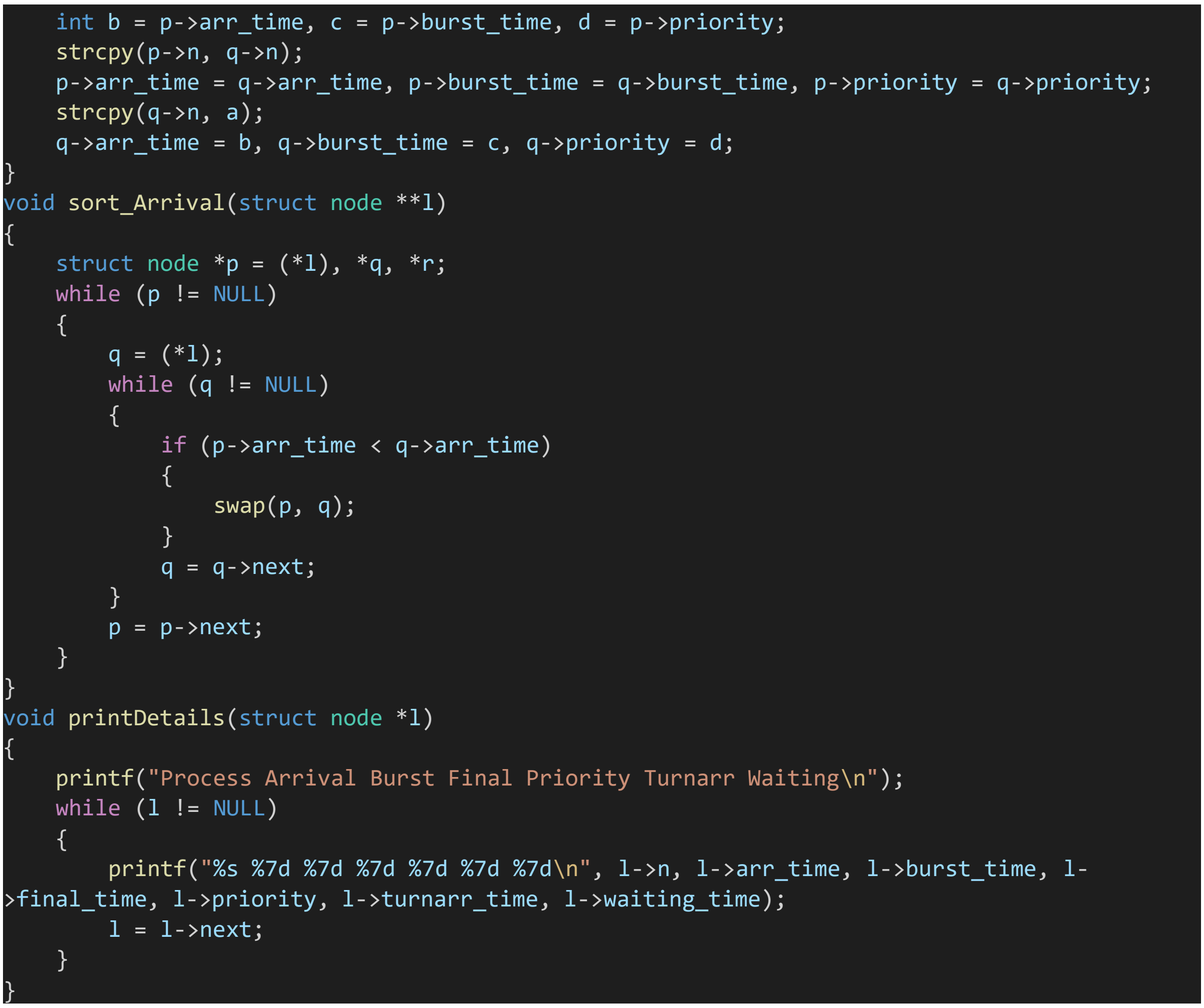
```
struct queue
```



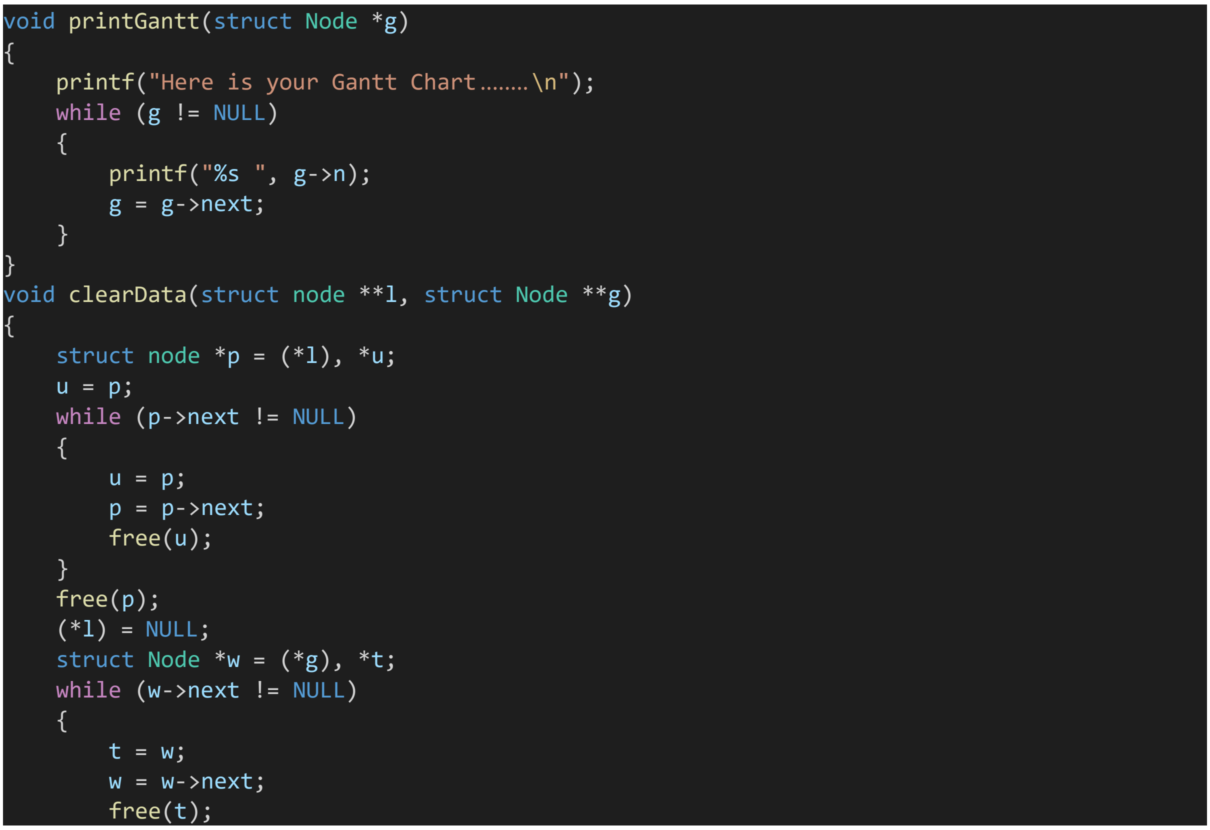
```
{
    char n[10];
    int arr_time;
    int burst_time;
    int priority;
    int final_time;
    int turnarr_time;
    int waiting_time;
    int response_time;
    struct queue *next;
};
struct Queue
{
    struct queue *front, *rear;
};
void readFile(struct node **l)
{
    FILE *fp;
    fp = fopen("Process.txt", "r");
    struct node *t;
    char a[10];
    int b, c, d;
    while ((fscanf(fp, "%s %d %d %d\n", a, &b, &c, &d)) != EOF)
    {
        t = (struct node *)malloc(sizeof(struct node));
        strcpy(t->n, a);
        t->arr_time = b;
        t->burst_time = c;
        t->priority = d;
        t->final_time = t->response_time = t->turnarr_time = t->waiting_time = t->c = 0;
        t->next = NULL;
        if ((*l) == NULL)
        {
            (*l) = t;
        }
        else
        {
            struct node *r = (*l);
            while (r->next != NULL)
            {
                r = r->next;
            }
            r->next = t;
        }
    }
}
int len(struct node *l)
{
    int len = 0;
    while (l != NULL)
    {
        l = l->next;
        len++;
    }
    return len;
}
```



```
void swap(struct node *p, struct node *q)
{
    char a[10];
    strcpy(a, p->n);
```

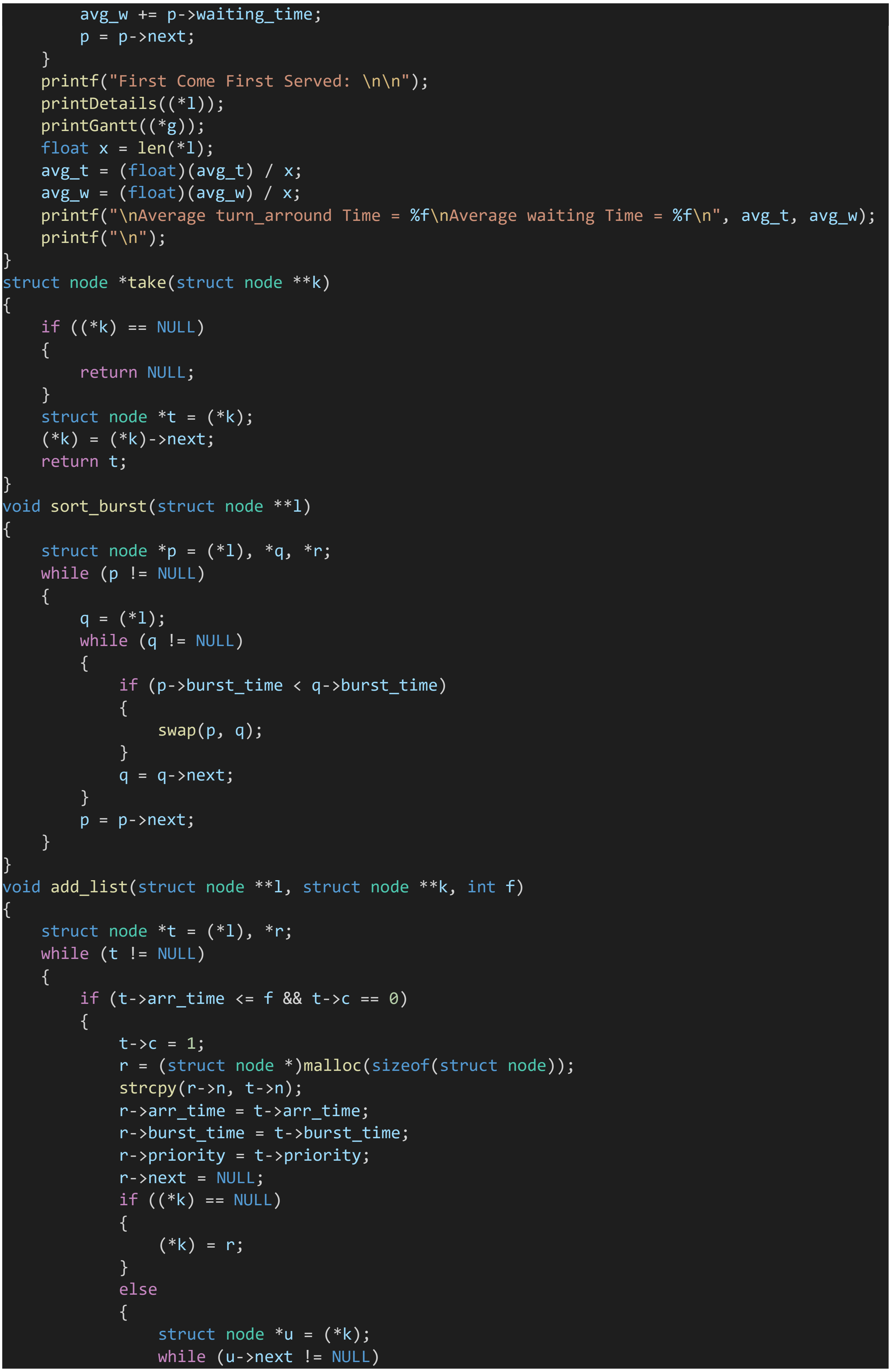


```
    int b = p->arr_time, c = p->burst_time, d = p->priority;
    strcpy(p->n, q->n);
    p->arr_time = q->arr_time, p->burst_time = q->burst_time, p->priority = q->priority;
    strcpy(q->n, a);
    q->arr_time = b, q->burst_time = c, q->priority = d;
}
void sort_Arrival(struct node **l)
{
    struct node *p = (*l), *q, *r;
    while (p != NULL)
    {
        q = (*l);
        while (q != NULL)
        {
            if (p->arr_time < q->arr_time)
            {
                swap(p, q);
            }
            q = q->next;
        }
        p = p->next;
    }
}
void printDetails(struct node *l)
{
    printf("Process Arrival Burst Final Priority Turnarr Waiting\n");
    while (l != NULL)
    {
        printf("%s %7d %7d %7d %7d %7d %7d\n", l->n, l->arr_time, l->burst_time, l-
>final_time, l->priority, l->turnarr_time, l->waiting_time);
        l = l->next;
    }
}
```

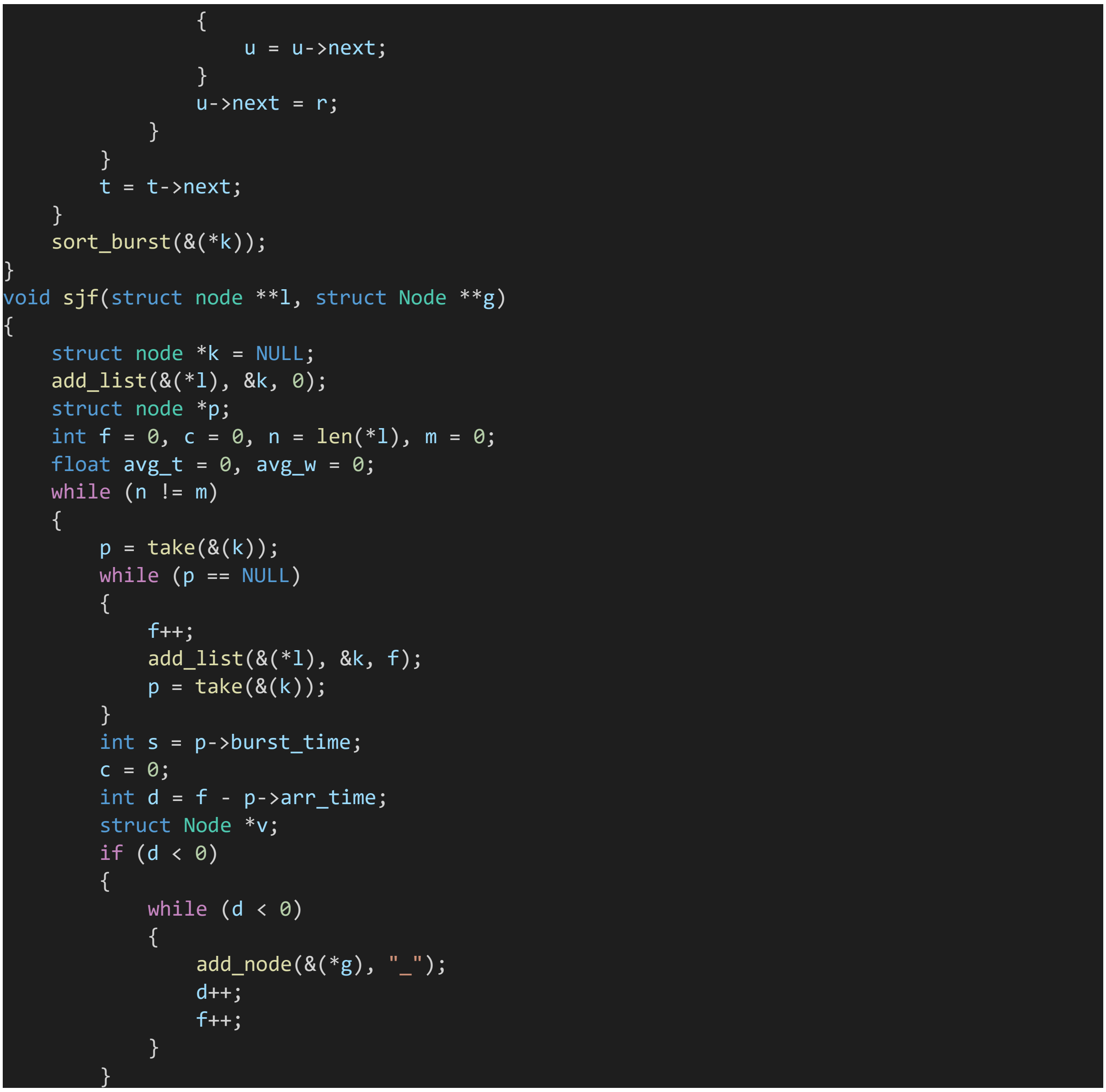


```
void printGantt(struct Node *g)
{
    printf("Here is your Gantt Chart........\n");
    while (g != NULL)
    {
        printf("%s ", g->n);
        g = g->next;
    }
}
void clearData(struct node **l, struct Node **g)
{
    struct node *p = (*l), *u;
    u = p;
    while (p->next != NULL)
    {
        u = p;
        p = p->next;
        free(u);
    }
    free(p);
    (*l) = NULL;
    struct Node *w = (*g), *t;
    while (w->next != NULL)
    {
        t = w;
        w = w->next;
        free(t);
    }
    free(w);
    (*g) = NULL;
}
```

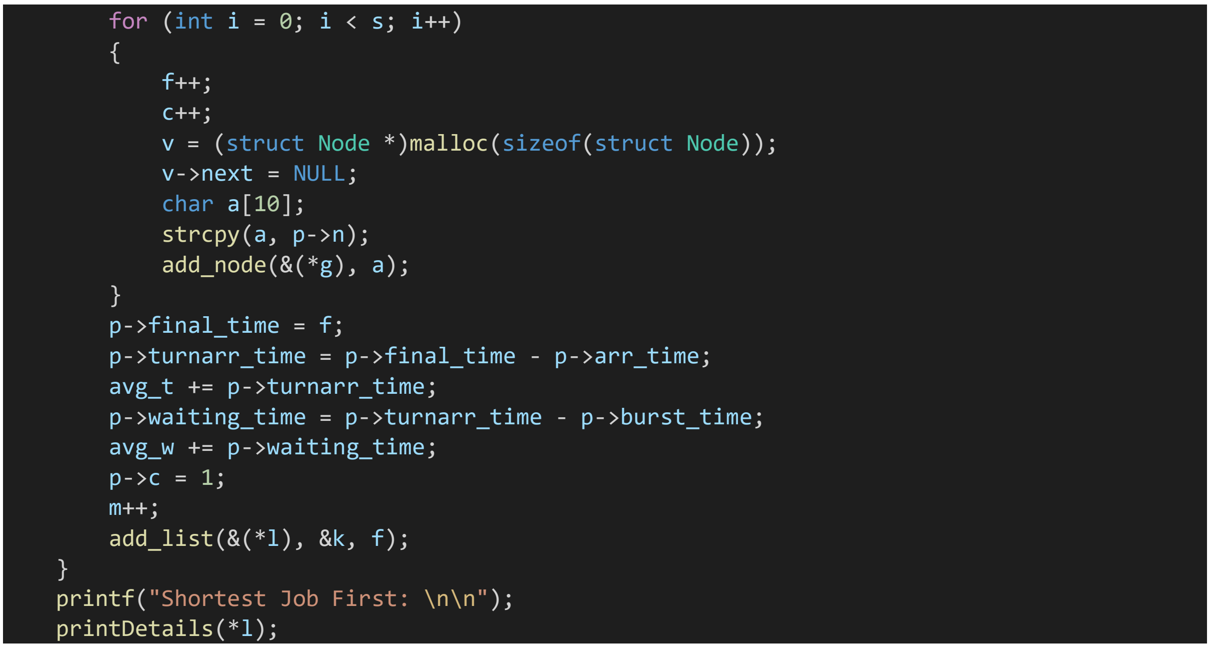
```
void add_node(struct Node **g, char *s)
{
    struct Node *v;
    v = (struct Node *)malloc(sizeof(struct Node));
    v->next = NULL;
    strcpy(v->n, s);
    if ((*g) == NULL)
    {
        (*g) = v;
    }
    else
    {
        struct Node *u = (*g);
        while (u->next != NULL)
        {
            u = u->next;
        }
        u->next = v;
    }
}
void fcfs(struct node **l, struct Node **g)
{
    sort_Arrival(&(*l));
    // printDetails((*l));
    struct node *p = (*l);
    int c = 0, f = 0;
    float avg_t = 0, avg_w = 0;
    while (p != NULL)
    {
        int s = p->burst_time;
        c = 0;
        int d = f - p->arr_time;
        struct Node *v;
        if (d < 0)
        {
            while (d < 0)
            {
                add_node(&(*g), "_");
                d++;
                f++;
            }
        }
        for (int i = 0; i < s; i++)
        {
            f++;
            c++;
            v = (struct Node *)malloc(sizeof(struct Node));
            v->next = NULL;
            char a[10];
            strcpy(a, p->n);
            add_node(&(*g), a);
        }
        p->final_time = f;
        p->turnarr_time = p->final_time - p->arr_time;
        avg_t += p->turnarr_time;
        p->waiting_time = p->turnarr_time - p->burst_time;
```



```
        avg_w += p->waiting_time;
        p = p->next;
    }
    printf("First Come First Served: \n\n");
    printDetails((*l));
    printGantt((*g));
    float x = len(*l);
    avg_t = (float)(avg_t) / x;
    avg_w = (float)(avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
struct node *take(struct node **k)
{
    if ((*k) == NULL)
    {
        return NULL;
    }
    struct node *t = (*k);
    (*k) = (*k)->next;
    return t;
}
void sort_burst(struct node **l)
{
    struct node *p = (*l), *q, *r;
    while (p != NULL)
    {
        q = (*l);
        while (q != NULL)
        {
            if (p->burst_time < q->burst_time)
            {
                swap(p, q);
            }
            q = q->next;
        }
        p = p->next;
    }
}
void add_list(struct node **l, struct node **k, int f)
{
    struct node *t = (*l), *r;
    while (t != NULL)
    {
        if (t->arr_time <= f && t->c == 0)
        {
            t->c = 1;
            r = (struct node *)malloc(sizeof(struct node));
            strcpy(r->n, t->n);
            r->arr_time = t->arr_time;
            r->burst_time = t->burst_time;
            r->priority = t->priority;
            r->next = NULL;
            if ((*k) == NULL)
            {
                (*k) = r;
            }
            else
            {
                struct node *u = (*k);
                while (u->next != NULL)
```



```
                {
                    u = u->next;
                }
                u->next = r;
            }
        }
        t = t->next;
    }
    sort_burst(&(*k));
}
void sjf(struct node **l, struct Node **g)
{
    struct node *k = NULL;
    add_list(&(*l), &k, 0);
    struct node *p;
    int f = 0, c = 0, n = len(*l), m = 0;
    float avg_t = 0, avg_w = 0;
    while (n != m)
    {
        p = take(&(k));
        while (p == NULL)
        {
            f++;
            add_list(&(*l), &k, f);
            p = take(&(k));
        }
        int s = p->burst_time;
        c = 0;
        int d = f - p->arr_time;
        struct Node *v;
        if (d < 0)
        {
            while (d < 0)
            {
                add_node(&(*g), "_");
                d++;
                f++;
            }
        }
```

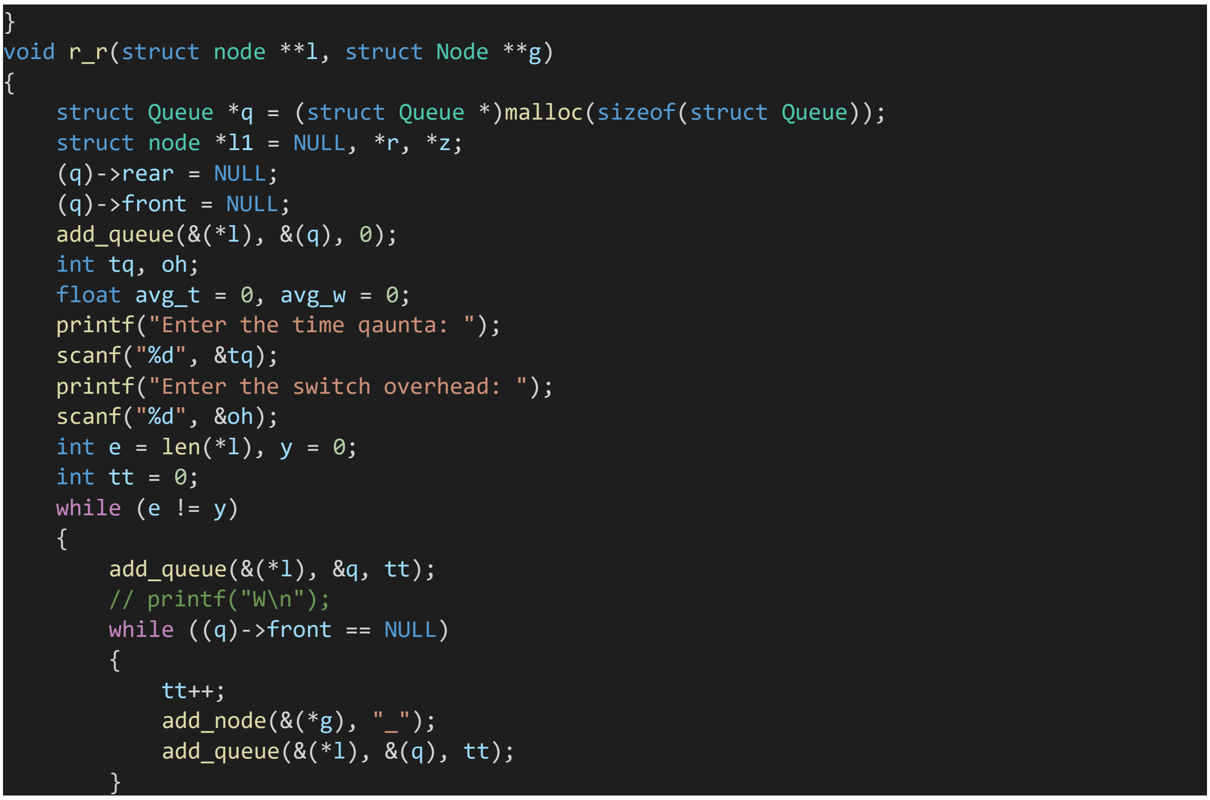


```
        for (int i = 0; i < s; i++)
        {
            f++;
            c++;
            v = (struct Node *)malloc(sizeof(struct Node));
            v->next = NULL;
            char a[10];
            strcpy(a, p->n);
            add_node(&(*g), a);
        }
        p->final_time = f;
        p->turnarr_time = p->final_time - p->arr_time;
        avg_t += p->turnarr_time;
        p->waiting_time = p->turnarr_time - p->burst_time;
        avg_w += p->waiting_time;
        p->c = 1;
        m++;
        add_list(&(*l), &k, f);
    }
    printf("Shortest Job First: \n\n");
    printDetails(*l);
    printGantt(*g);
```

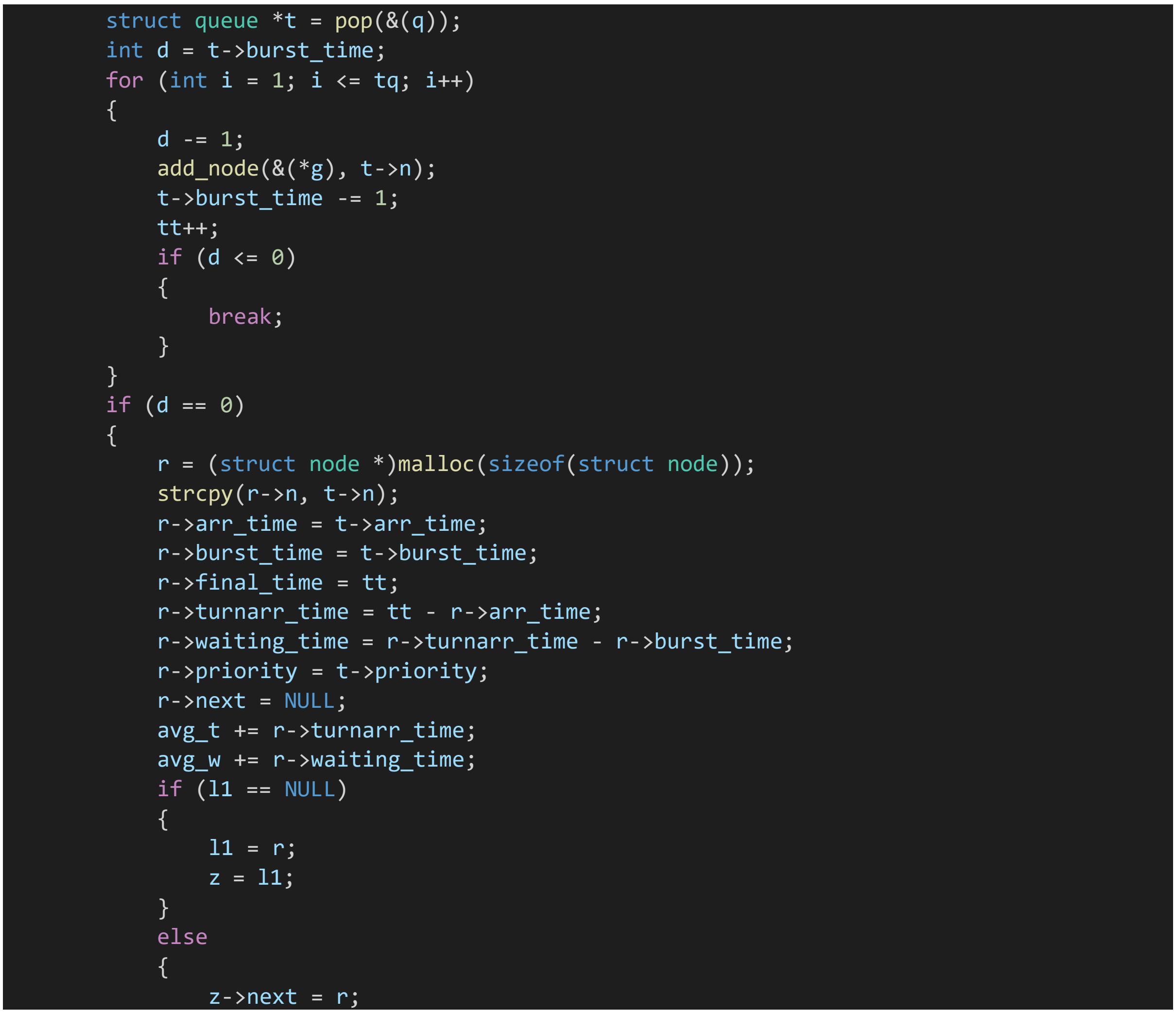
```
    float x = len(*l);
    avg_t = (float)(avg_t) / x;
    avg_w = (float)(avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
struct queue *create(char *a, int b, int c, int d)
{
    struct queue *t = (struct queue *)malloc(sizeof(struct queue));
    strcpy(t->n, a);
    t->arr_time = b, t->burst_time = c, t->priority = d;
    t->next = NULL;
    return t;
}
void add_queue(struct node **l, struct Queue **q, int f)
{
    struct node *p = (*l);
    while (p != NULL)
    {
        if (p->c == 0 && p->arr_time <= f)
        {
            p->c = 1;
            struct queue *t = create(p->n, p->arr_time, p->burst_time, p->priority);
            if ((*q)->rear == NULL)
            {
                (*q)->rear = t;
                (*q)->front = t;
            }
            else
            {
                (*q)->rear->next = t;
                (*q)->rear = t;
            }
        }
        p = p->next;
    }
}
```

```
struct queue *pop(struct Queue **q)
{
    if ((*q)->front == NULL)
    {
        return NULL;
    }
    struct queue *t = (*q)->front;
    (*q)->front = (*q)->front->next;
    if ((*q)->front == NULL)
        (*q)->rear = NULL;
    return t;
}
```

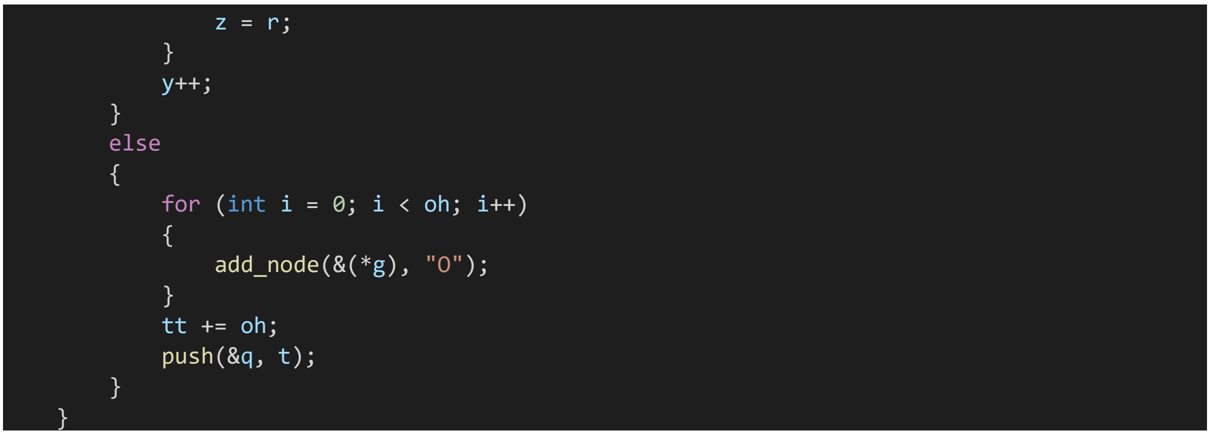
```
void push(struct Queue **q, struct queue *t)
{
    if ((*q)->rear == NULL)
    {
        (*q)->front = (*q)->rear = t;
    }
    (*q)->rear->next = t;
    (*q)->rear = t;
```



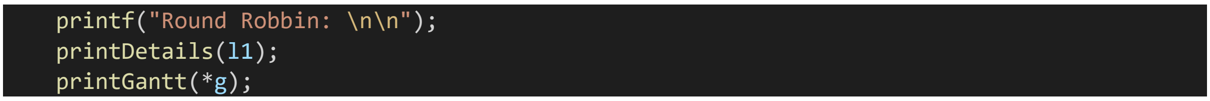
```
}
void r_r(struct node **l, struct Node **g)
{
    struct Queue *q = (struct Queue *)malloc(sizeof(struct Queue));
    struct node *l1 = NULL, *r, *z;
    (q)->rear = NULL;
    (q)->front = NULL;
    add_queue(&(*l), &(q), 0);
    int tq, oh;
    float avg_t = 0, avg_w = 0;
    printf("Enter the time qaunta: ");
    scanf("%d", &tq);
    printf("Enter the switch overhead: ");
    scanf("%d", &oh);
    int e = len(*l), y = 0;
    int tt = 0;
    while (e != y)
    {
        add_queue(&(*l), &q, tt);
        // printf("W\n");
        while ((q)->front == NULL)
        {
            tt++;
            add_node(&(*g), "_");
            add_queue(&(*l), &(q), tt);
        }
```



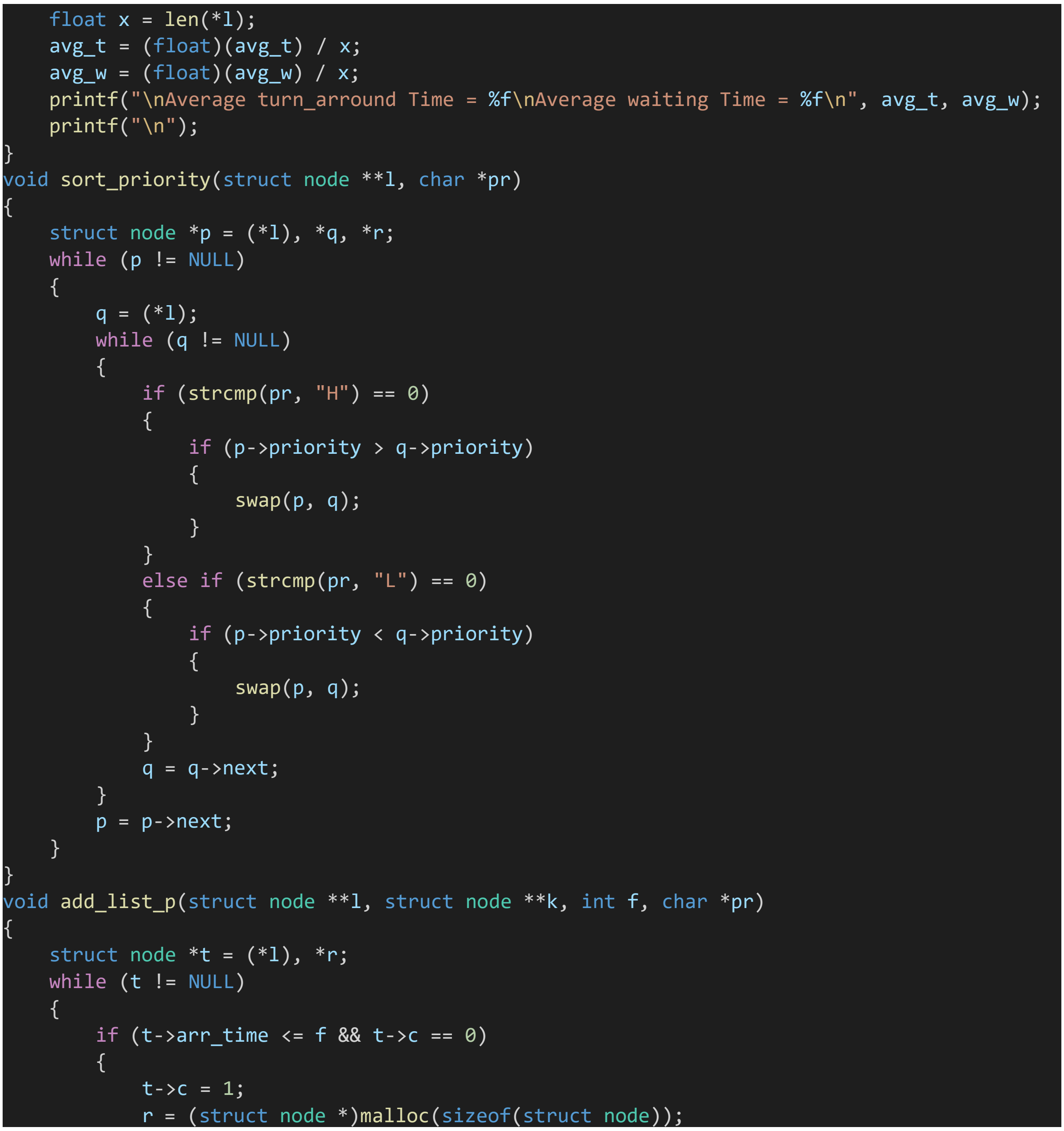
```
        struct queue *t = pop(&(q));
        int d = t->burst_time;
        for (int i = 1; i <= tq; i++)
        {
            d -= 1;
            add_node(&(*g), t->n);
            t->burst_time -= 1;
            tt++;
            if (d <= 0)
            {
                break;
            }
        }
        if (d == 0)
        {
            r = (struct node *)malloc(sizeof(struct node));
            strcpy(r->n, t->n);
            r->arr_time = t->arr_time;
            r->burst_time = t->burst_time;
            r->final_time = tt;
            r->turnarr_time = tt - r->arr_time;
            r->waiting_time = r->turnarr_time - r->burst_time;
            r->priority = t->priority;
            r->next = NULL;
            avg_t += r->turnarr_time;
            avg_w += r->waiting_time;
            if (l1 == NULL)
            {
                l1 = r;
                z = l1;
            }
            else
            {
                z->next = r;
```



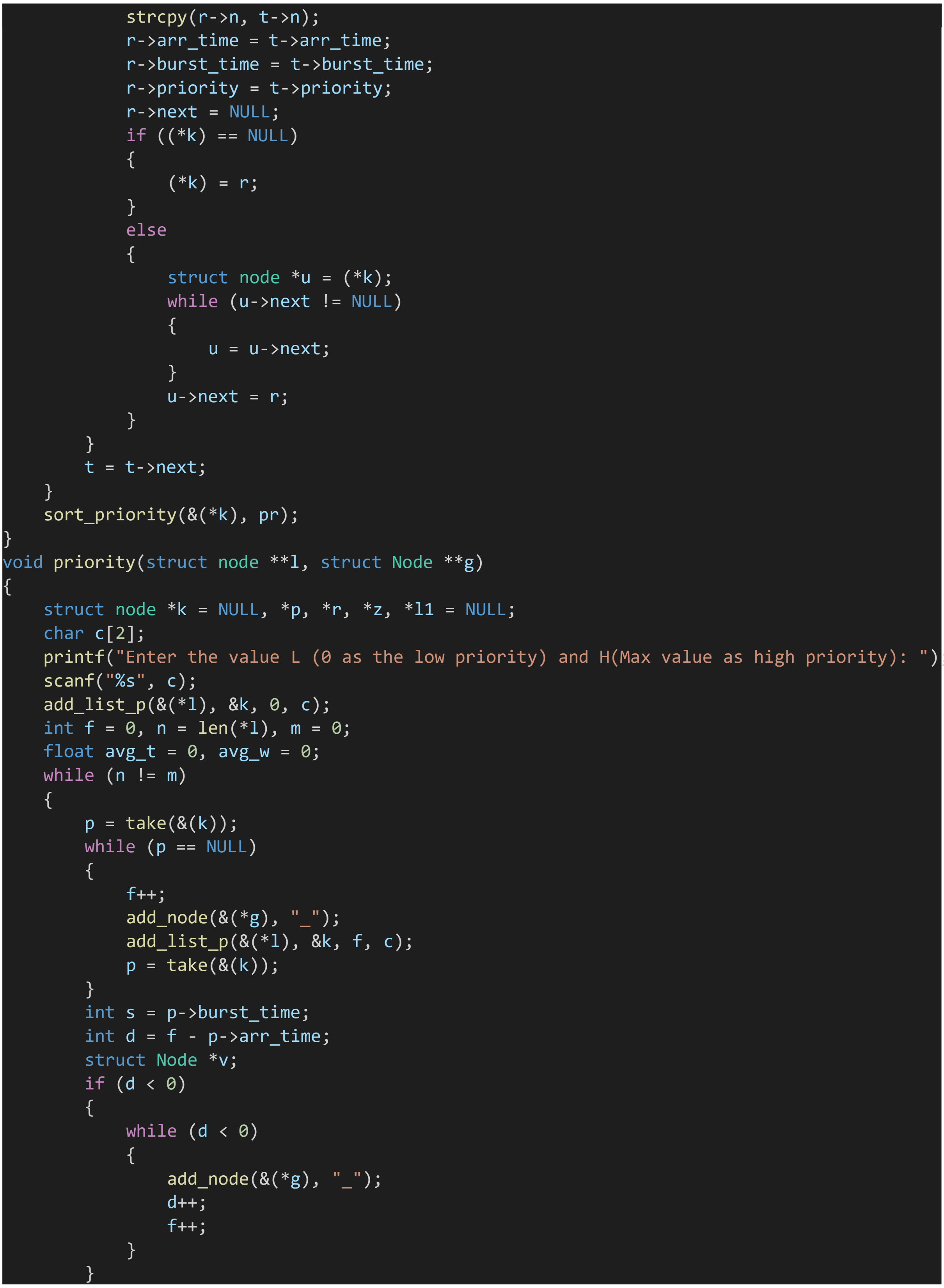
```
                z = r;
            }
            y++;
        }
        else
        {
            for (int i = 0; i < oh; i++)
            {
                add_node(&(*g), "O");
            }
            tt += oh;
            push(&q, t);
        }
    }
```



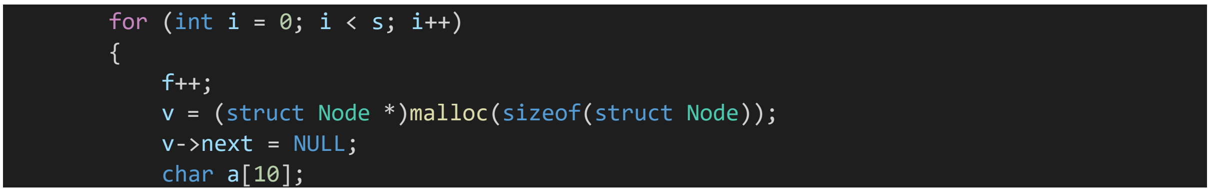
```
    printf("Round Robbin: \n\n");
    printDetails(l1);
    printGantt(*g);
```



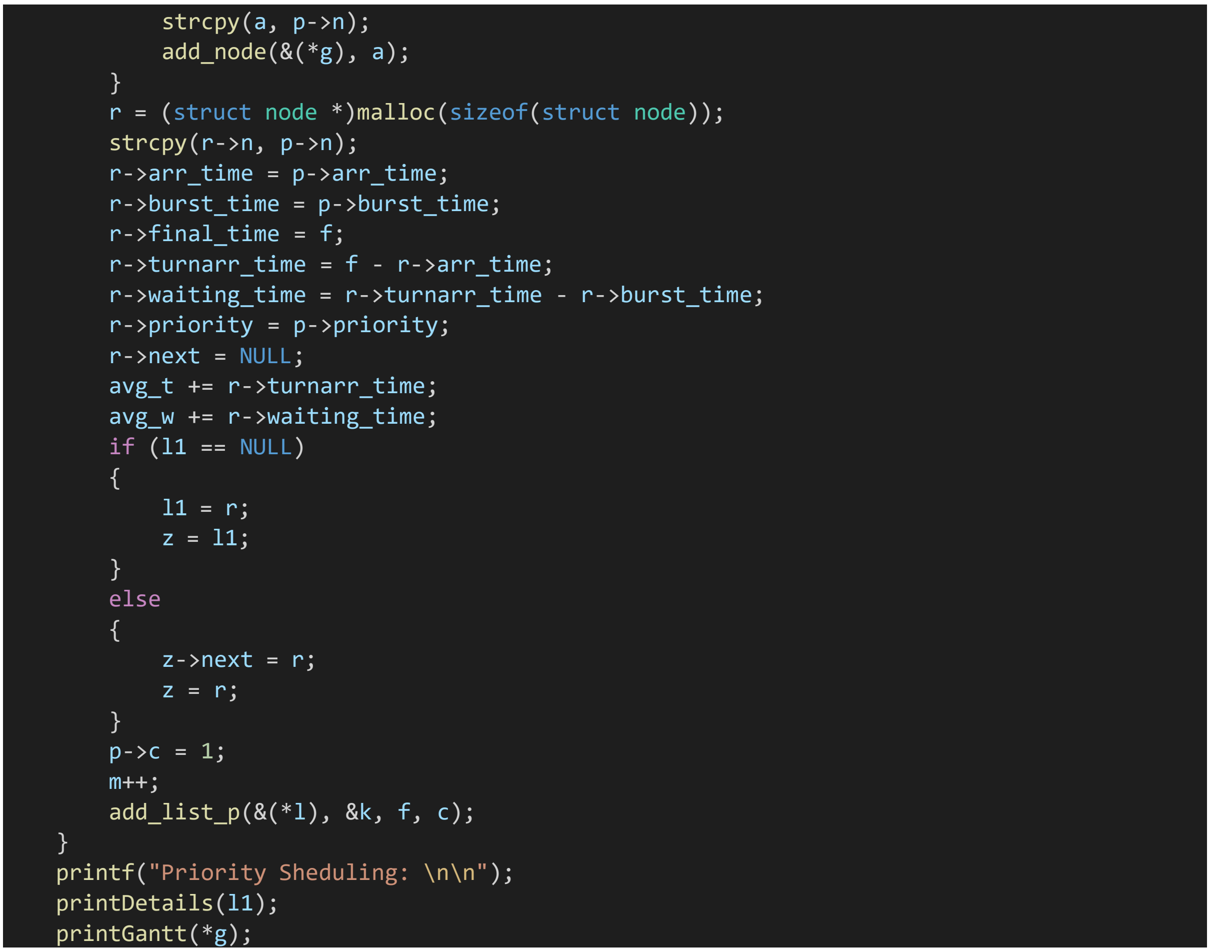
```
    float x = len(*l);
    avg_t = (float)(avg_t) / x;
    avg_w = (float)(avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
void sort_priority(struct node **l, char *pr)
{
    struct node *p = (*l), *q, *r;
    while (p != NULL)
    {
        q = (*l);
        while (q != NULL)
        {
            if (strcmp(pr, "H") == 0)
            {
                if (p->priority > q->priority)
                {
                    swap(p, q);
                }
            }
            else if (strcmp(pr, "L") == 0)
            {
                if (p->priority < q->priority)
                {
                    swap(p, q);
                }
            }
            q = q->next;
        }
        p = p->next;
    }
}
void add_list_p(struct node **l, struct node **k, int f, char *pr)
{
    struct node *t = (*l), *r;
    while (t != NULL)
    {
        if (t->arr_time <= f && t->c == 0)
        {
            t->c = 1;
            r = (struct node *)malloc(sizeof(struct node));
```



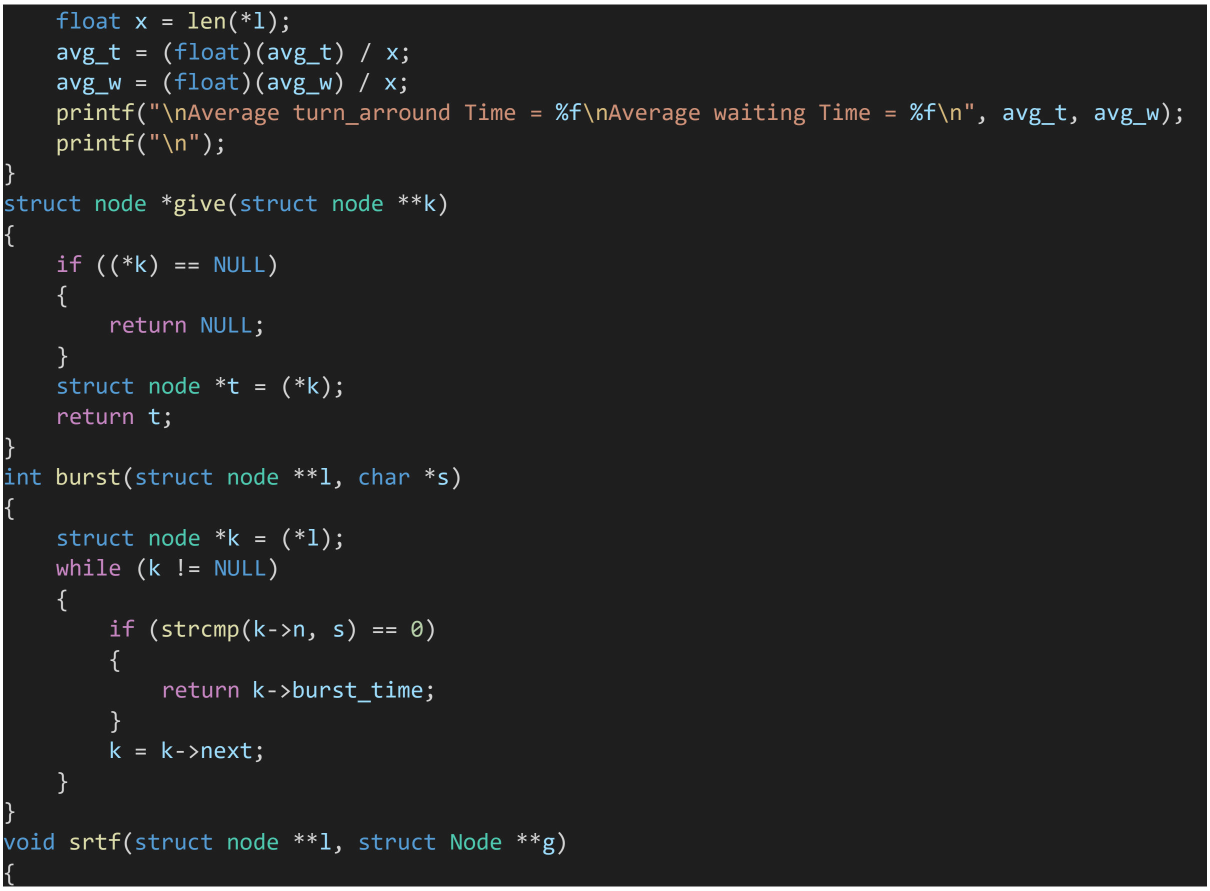
```
            strcpy(r->n, t->n);
            r->arr_time = t->arr_time;
            r->burst_time = t->burst_time;
            r->priority = t->priority;
            r->next = NULL;
            if ((*k) == NULL)
            {
                (*k) = r;
            }
            else
            {
                struct node *u = (*k);
                while (u->next != NULL)
                {
                    u = u->next;
                }
                u->next = r;
            }
        }
        t = t->next;
    }
    sort_priority(&(*k), pr);
}
void priority(struct node **l, struct Node **g)
{
    struct node *k = NULL, *p, *r, *z, *l1 = NULL;
    char c[2];
    printf("Enter the value L (0 as the low priority) and H(Max value as high priority): ");
    scanf("%s", c);
    add_list_p(&(*l), &k, 0, c);
    int f = 0, n = len(*l), m = 0;
    float avg_t = 0, avg_w = 0;
    while (n != m)
    {
        p = take(&(k));
        while (p == NULL)
        {
            f++;
            add_node(&(*g), "_");
            add_list_p(&(*l), &k, f, c);
            p = take(&(k));
        }
        int s = p->burst_time;
        int d = f - p->arr_time;
        struct Node *v;
        if (d < 0)
        {
            while (d < 0)
            {
                add_node(&(*g), "_");
                d++;
                f++;
            }
        }
```



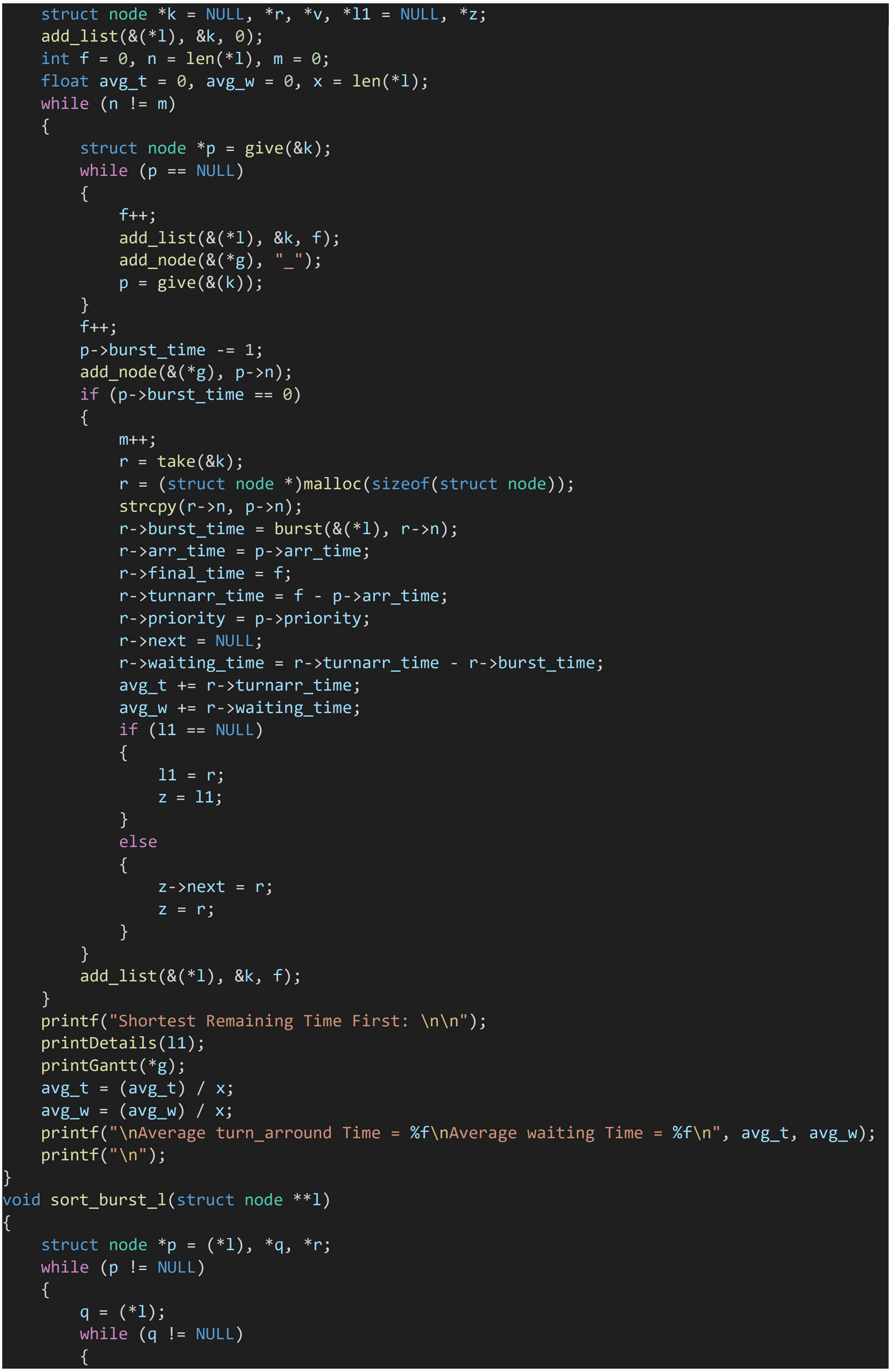
```
        for (int i = 0; i < s; i++)
        {
            f++;
            v = (struct Node *)malloc(sizeof(struct Node));
            v->next = NULL;
            char a[10];
```



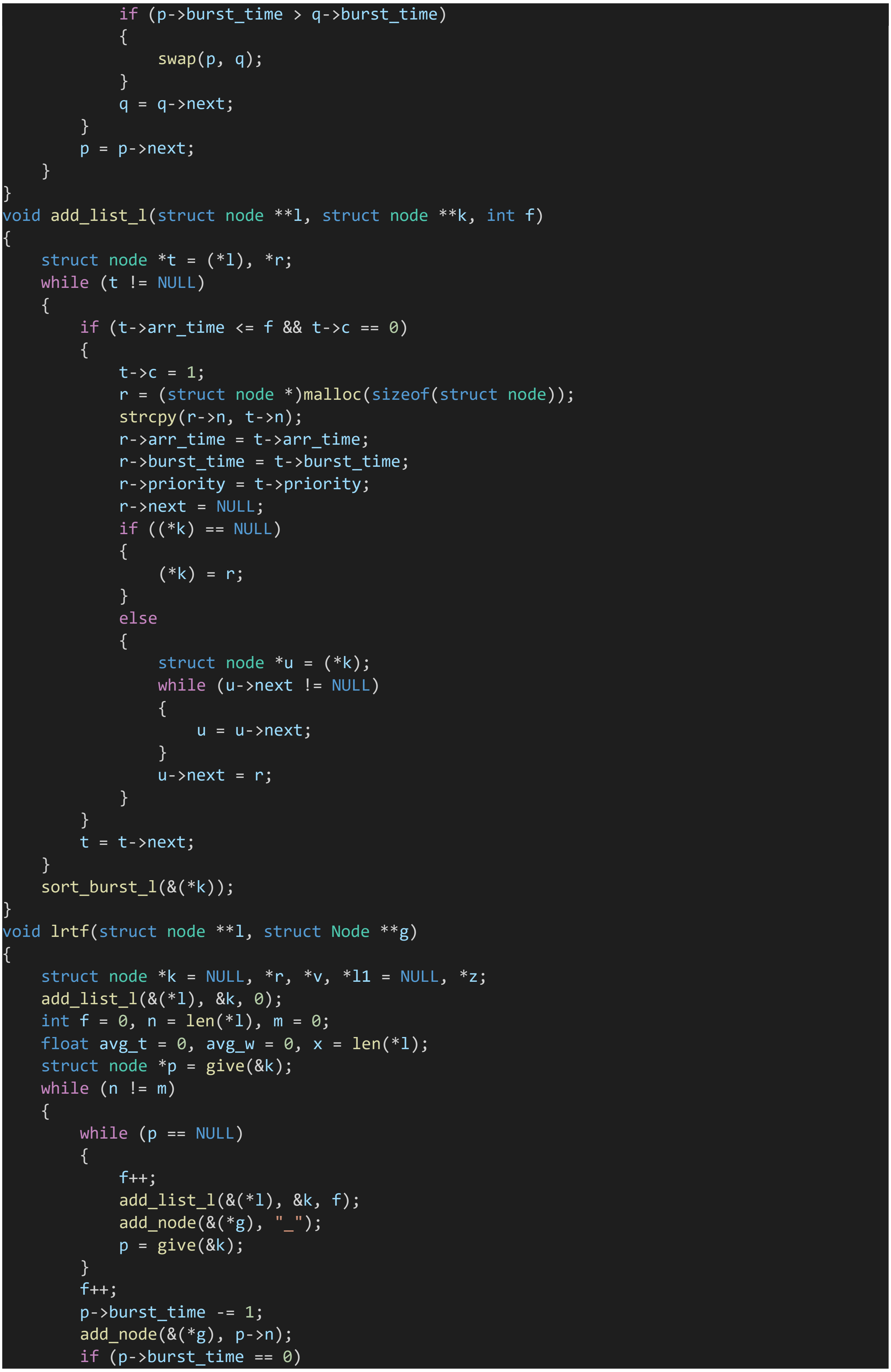
```
            strcpy(a, p->n);
            add_node(&(*g), a);
        }
        r = (struct node *)malloc(sizeof(struct node));
        strcpy(r->n, p->n);
        r->arr_time = p->arr_time;
        r->burst_time = p->burst_time;
        r->final_time = f;
        r->turnarr_time = f - r->arr_time;
        r->waiting_time = r->turnarr_time - r->burst_time;
        r->priority = p->priority;
        r->next = NULL;
        avg_t += r->turnarr_time;
        avg_w += r->waiting_time;
        if (l1 == NULL)
        {
            l1 = r;
            z = l1;
        }
        else
        {
            z->next = r;
            z = r;
        }
        p->c = 1;
        m++;
        add_list_p(&(*l), &k, f, c);
    }
    printf("Priority Sheduling: \n\n");
    printDetails(l1);
    printGantt(*g);
```



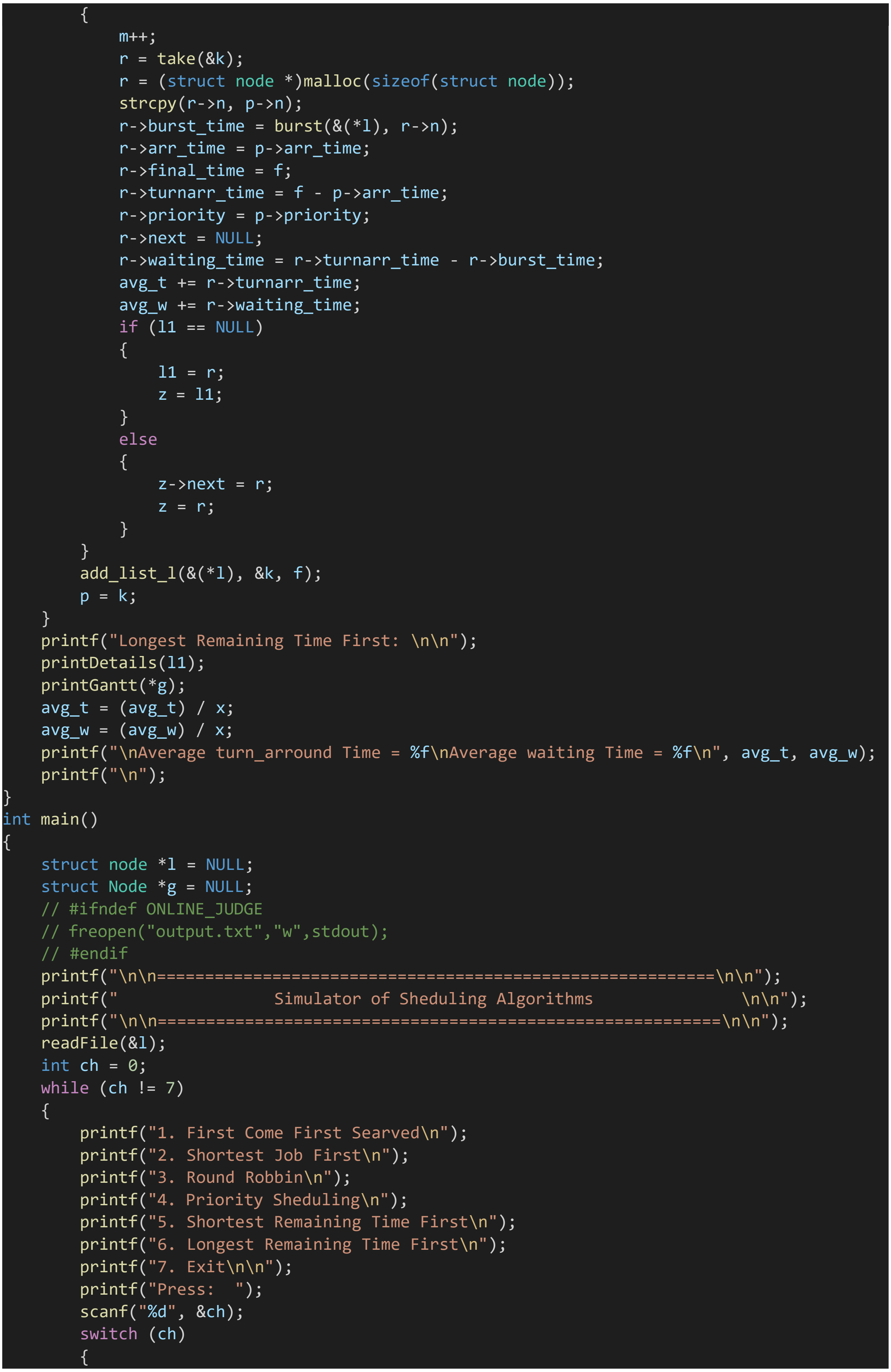
```
    float x = len(*l);
    avg_t = (float)(avg_t) / x;
    avg_w = (float)(avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
struct node *give(struct node **k)
{
    if ((*k) == NULL)
    {
        return NULL;
    }
    struct node *t = (*k);
    return t;
}
int burst(struct node **l, char *s)
{
    struct node *k = (*l);
    while (k != NULL)
    {
        if (strcmp(k->n, s) == 0)
        {
            return k->burst_time;
        }
        k = k->next;
    }
}
void srtf(struct node **l, struct Node **g)
{
```



```c
    struct node *k = NULL, *r, *v, *l1 = NULL, *z;
    add_list(&(*l), &k, 0);
    int f = 0, n = len(*l), m = 0;
    float avg_t = 0, avg_w = 0, x = len(*l);
    while (n != m)
    {
        struct node *p = give(&k);
        while (p == NULL)
        {
            f++;
            add_list(&(*l), &k, f);
            add_node(&(*g), "_");
            p = give(&(k));
        }
        f++;
        p->burst_time -= 1;
        add_node(&(*g), p->n);
        if (p->burst_time == 0)
        {
            m++;
            r = take(&k);
            r = (struct node *)malloc(sizeof(struct node));
            strcpy(r->n, p->n);
            r->burst_time = burst(&(*l), r->n);
            r->arr_time = p->arr_time;
            r->final_time = f;
            r->turnarr_time = f - p->arr_time;
            r->priority = p->priority;
            r->next = NULL;
            r->waiting_time = r->turnarr_time - r->burst_time;
            avg_t += r->turnarr_time;
            avg_w += r->waiting_time;
            if (l1 == NULL)
            {
                l1 = r;
                z = l1;
            }
            else
            {
                z->next = r;
                z = r;
            }
        }
        add_list(&(*l), &k, f);
    }
    printf("Shortest Remaining Time First: \n\n");
    printDetails(l1);
    printGantt(*g);
    avg_t = (avg_t) / x;
    avg_w = (avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
void sort_burst_l(struct node **l)
{
    struct node *p = (*l), *q, *r;
    while (p != NULL)
    {
        q = (*l);
        while (q != NULL)
        {
```



```c
            if (p->burst_time > q->burst_time)
            {
                swap(p, q);
            }
            q = q->next;
        }
        p = p->next;
    }
}
void add_list_l(struct node **l, struct node **k, int f)
{
    struct node *t = (*l), *r;
    while (t != NULL)
    {
        if (t->arr_time <= f && t->c == 0)
        {
            t->c = 1;
            r = (struct node *)malloc(sizeof(struct node));
            strcpy(r->n, t->n);
            r->arr_time = t->arr_time;
            r->burst_time = t->burst_time;
            r->priority = t->priority;
            r->next = NULL;
            if ((*k) == NULL)
            {
                (*k) = r;
            }
            else
            {
                struct node *u = (*k);
                while (u->next != NULL)
                {
                    u = u->next;
                }
                u->next = r;
            }
        }
        t = t->next;
    }
    sort_burst_l(&(*k));
}
void lrtf(struct node **l, struct Node **g)
{
    struct node *k = NULL, *r, *v, *l1 = NULL, *z;
    add_list_l(&(*l), &k, 0);
    int f = 0, n = len(*l), m = 0;
    float avg_t = 0, avg_w = 0, x = len(*l);
    struct node *p = give(&k);
    while (n != m)
    {
        while (p == NULL)
        {
            f++;
            add_list_l(&(*l), &k, f);
            add_node(&(*g), "_");
            p = give(&k);
        }
        f++;
        p->burst_time -= 1;
        add_node(&(*g), p->n);
        if (p->burst_time == 0)
```



```
        {
            m++;
            r = take(&k);
            r = (struct node *)malloc(sizeof(struct node));
            strcpy(r->n, p->n);
            r->burst_time = burst(&(*l), r->n);
            r->arr_time = p->arr_time;
            r->final_time = f;
            r->turnarr_time = f - p->arr_time;
            r->priority = p->priority;
            r->next = NULL;
            r->waiting_time = r->turnarr_time - r->burst_time;
            avg_t += r->turnarr_time;
            avg_w += r->waiting_time;
            if (l1 == NULL)
            {
                l1 = r;
                z = l1;
            }
            else
            {
                z->next = r;
                z = r;
            }
        }
        add_list_l(&(*l), &k, f);
        p = k;
    }
    printf("Longest Remaining Time First: \n\n");
    printDetails(l1);
    printGantt(*g);
    avg_t = (avg_t) / x;
    avg_w = (avg_w) / x;
    printf("\nAverage turn_arround Time = %f\nAverage waiting Time = %f\n", avg_t, avg_w);
    printf("\n");
}
int main()
{
    struct node *l = NULL;
    struct Node *g = NULL;
    // #ifndef ONLINE_JUDGE
    // freopen("output.txt","w",stdout);
    // #endif
    printf("\n\n==================================================\n\n");
    printf("              Simulator of Sheduling Algorithms             \n\n");
    printf("\n\n===================================================\n\n");
    readFile(&l);
    int ch = 0;
    while (ch != 7)
    {
        printf("1. First Come First Searved\n");
        printf("2. Shortest Job First\n");
        printf("3. Round Robbin\n");
        printf("4. Priority Sheduling\n");
        printf("5. Shortest Remaining Time First\n");
        printf("6. Longest Remaining Time First\n");
        printf("7. Exit\n\n");
        printf("Press:  ");
        scanf("%d", &ch);
        switch (ch)
        {
```

```
        case 1:
            fcfs(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 2:
            sjf(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 3:
            r_r(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 4:
            priority(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 5:
            srtf(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 6:
            lrtf(&l, &g);
            clearData(&l, &g);
            readFile(&l);
            break;

        case 7:
            printf("\n\n================================================\n\n");
            printf("              THANK YOU..:)                      ");
            printf("\n\n================================================\n\n");
            break;
        default:
            printf("Please press valid button..!!!\n\n");
            break;
        }
    }
}
```

Output file:

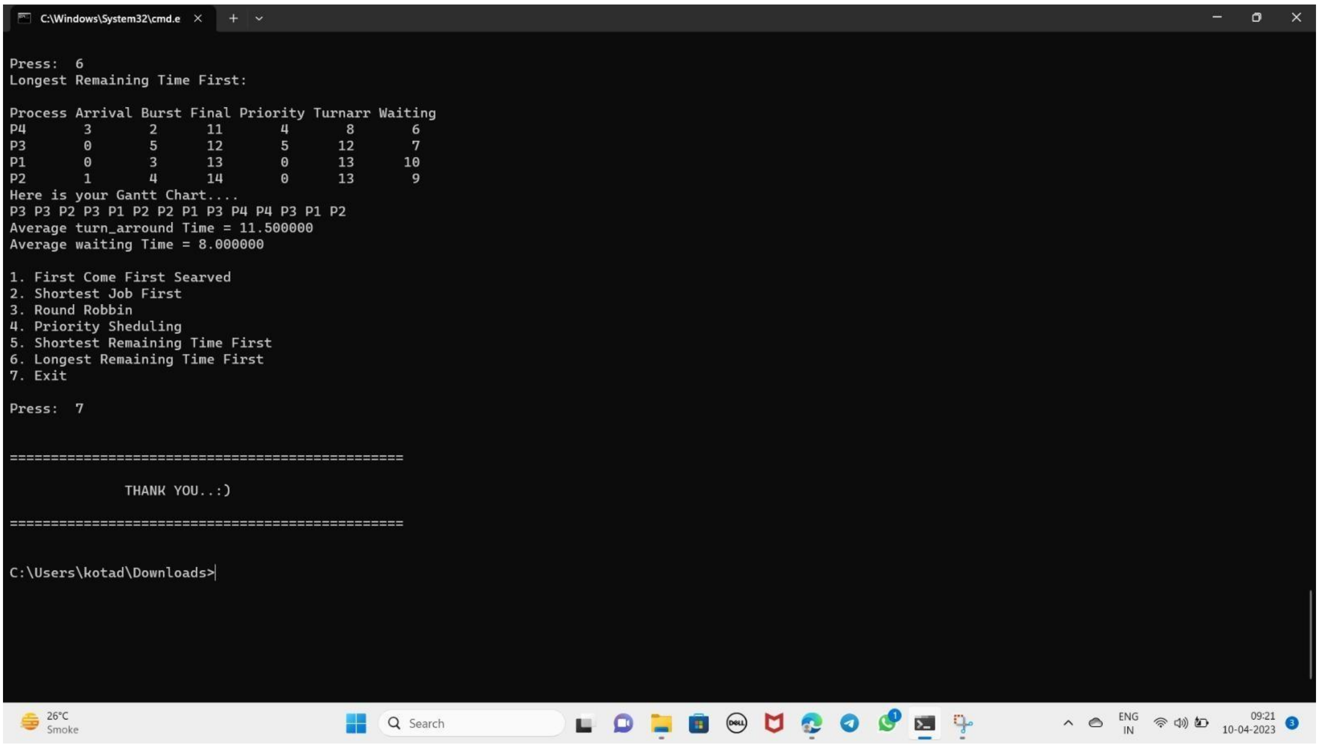
P1 0 3 0

P2 1 4 0

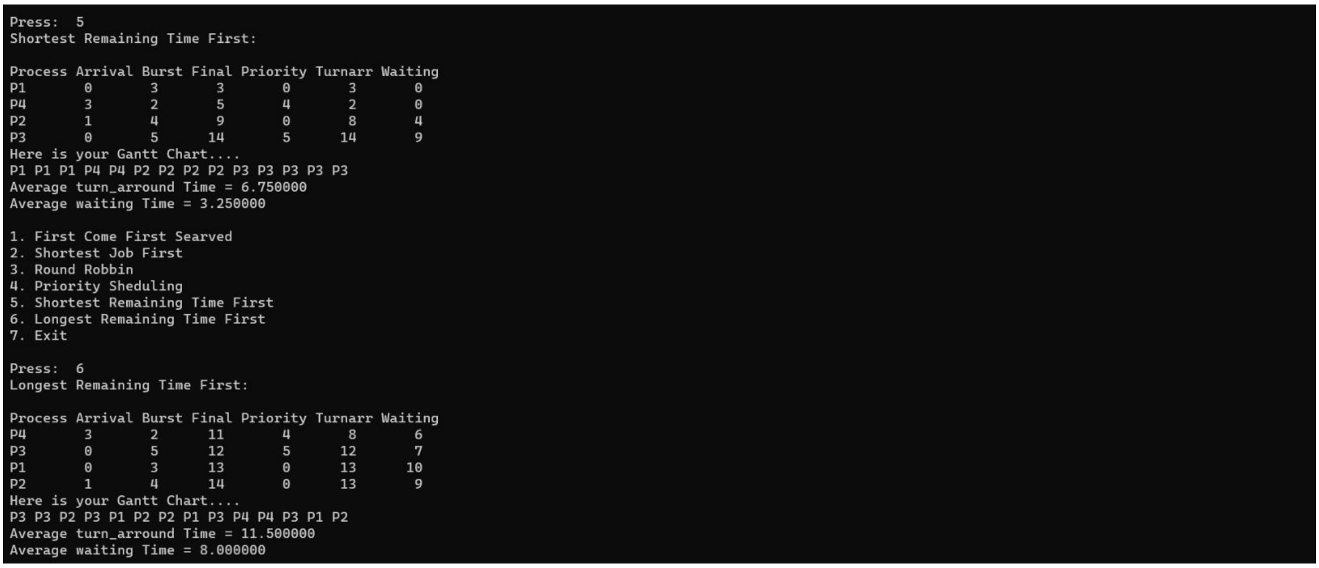
P3 0 5 5

P4 3 2 4

Screenshots of output:

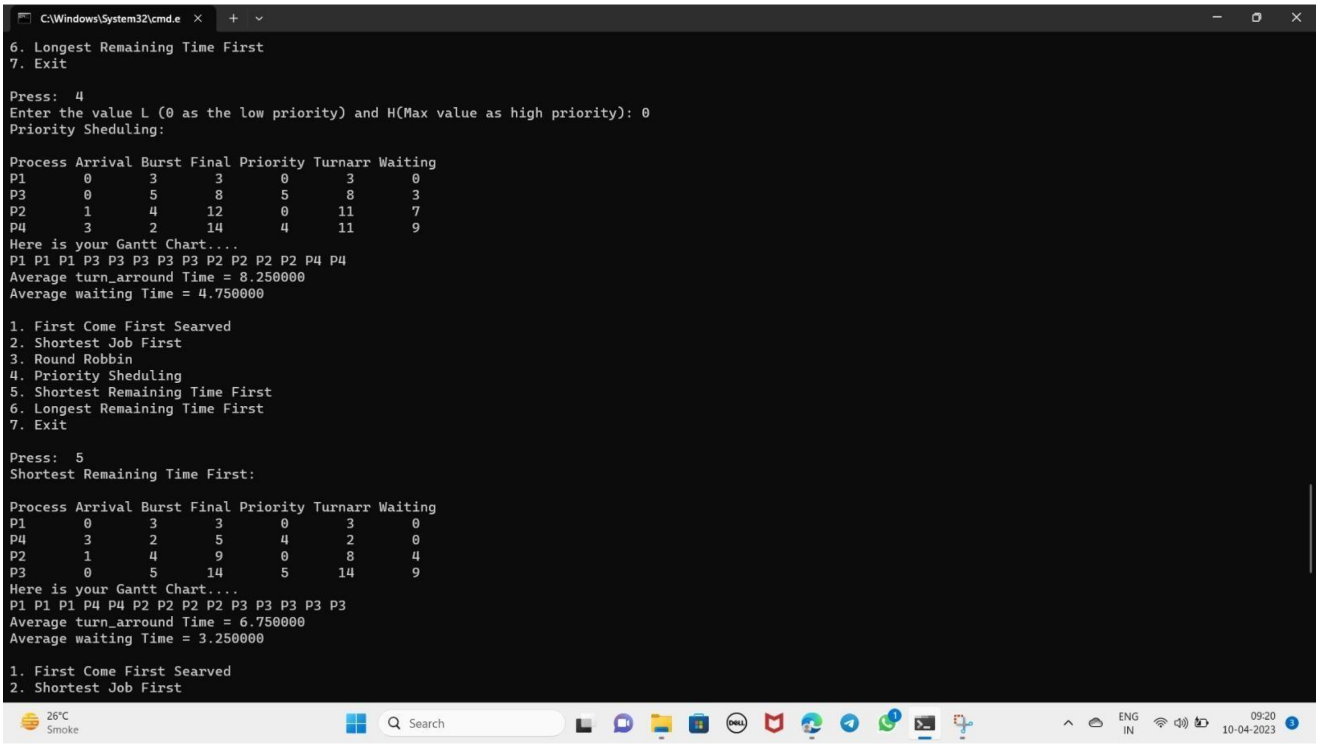


```
Press:  6
Longest Remaining Time First:

Process Arrival Burst Final Priority Turnarr Waiting
P4       3       2      11       4       8       6
P3       0       5      12       5      12       7
P1       0       3      13       0      13      10
P2       1       4      14       0      13       9
Here is your Gantt Chart....
P3 P3 P2 P3 P1 P2 P2 P1 P3 P4 P4 P3 P1 P2
Average turn_arround Time = 11.500000
Average waiting Time = 8.000000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  7


================================================

              THANK YOU..:)

================================================


C:\Users\kotad\Downloads>
```

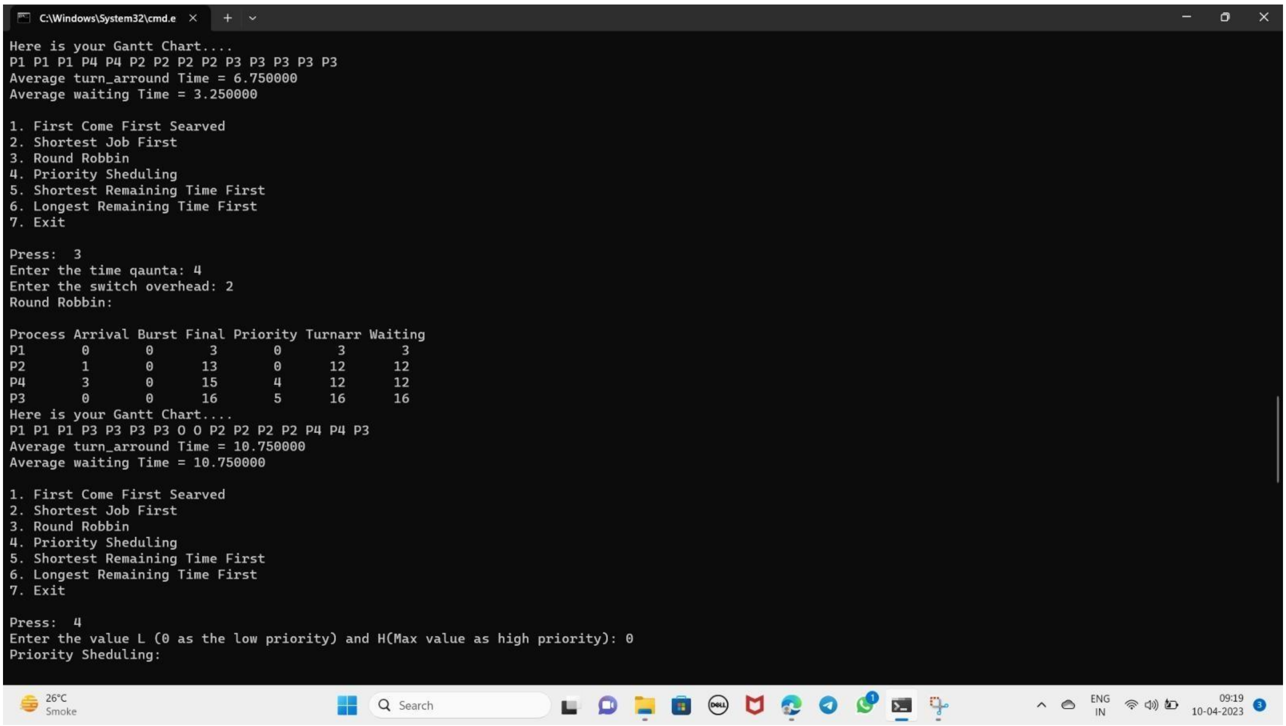


```
Press:  5
Shortest Remaining Time First:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0       3       3       0       3       0
P4       3       2       5       4       2       0
P2       1       4       9       0       8       4
P3       0       5      14       5      14       9
Here is your Gantt Chart....
P1 P1 P1 P4 P4 P2 P2 P2 P2 P3 P3 P3 P3 P3
Average turn_arround Time = 6.750000
Average waiting Time = 3.250000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  6
Longest Remaining Time First:

Process Arrival Burst Final Priority Turnarr Waiting
P4       3       2      11       4       8       6
P3       0       5      12       5      12       7
P1       0       3      13       0      13      10
P2       1       4      14       0      13       9
Here is your Gantt Chart....
P3 P3 P2 P3 P1 P2 P2 P1 P3 P4 P4 P3 P1 P2
Average turn_arround Time = 11.500000
Average waiting Time = 8.000000
```

OS Innovative Assignment

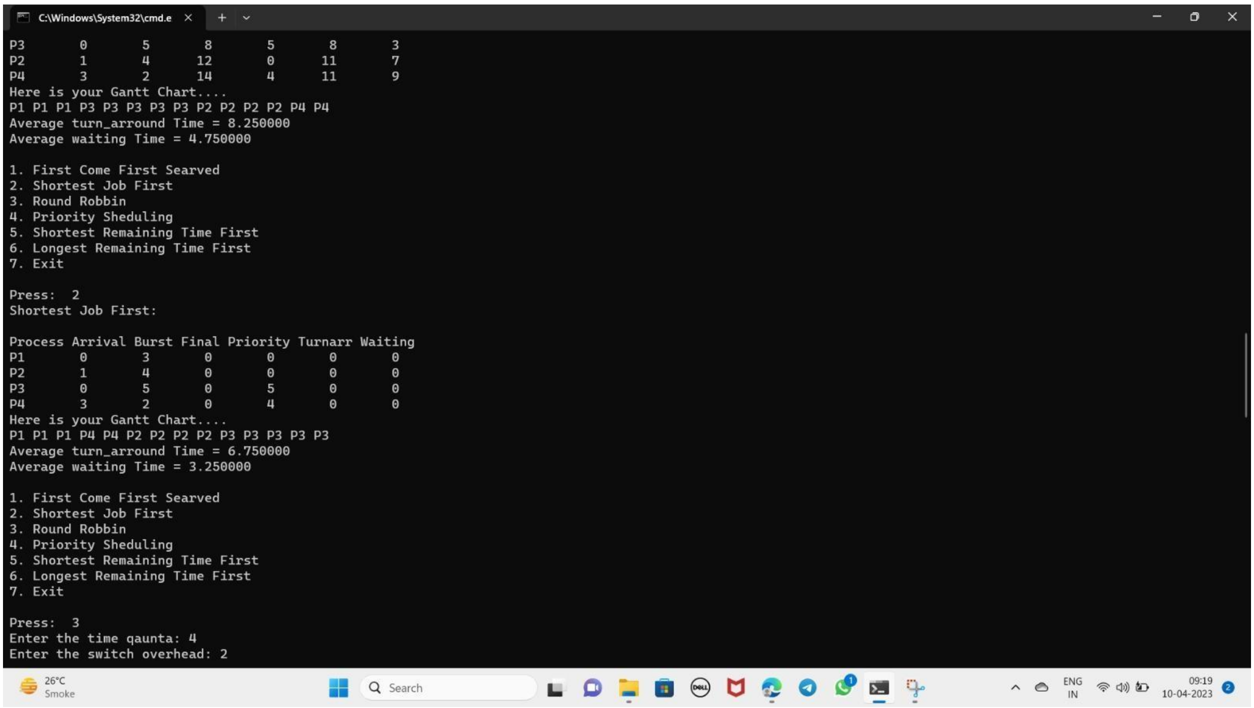


```
6. Longest Remaining Time First
7. Exit

Press:  4
Enter the value L (0 as the low priority) and H(Max value as high priority): 0
Priority Sheduling:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0        3       3       0       3       0
P3       0        5       8       5       8       3
P2       1        4      12       0      11       7
P4       3        2      14       4      11       9
Here is your Gantt Chart....
P1 P1 P1 P3 P3 P3 P3 P3 P2 P2 P2 P2 P4 P4
Average turn_arround Time = 8.250000
Average waiting Time = 4.750000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  5
Shortest Remaining Time First:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0        3       3       0       3       0
P4       3        2       5       4       2       0
P2       1        4       9       0       8       4
P3       0        5      14       5      14       9
Here is your Gantt Chart....
P1 P1 P1 P4 P4 P2 P2 P2 P2 P3 P3 P3 P3 P3
Average turn_arround Time = 6.750000
Average waiting Time = 3.250000

1. First Come First Searved
2. Shortest Job First
```

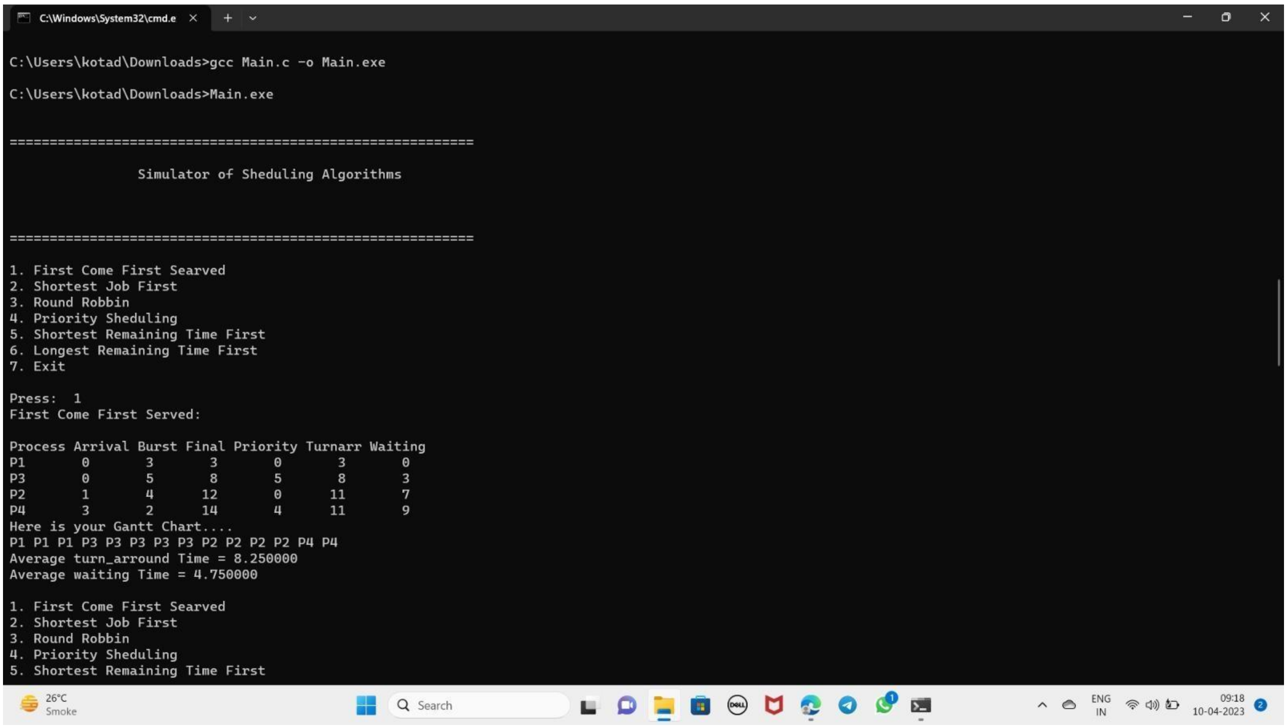


```
Here is your Gantt Chart....
P1 P1 P1 P4 P4 P2 P2 P2 P2 P3 P3 P3 P3 P3
Average turn_arround Time = 6.750000
Average waiting Time = 3.250000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  3
Enter the time qaunta: 4
Enter the switch overhead: 2
Round Robbin:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0        0       3       0       3       3
P2       1        0      13       0      12      12
P4       3        0      15       4      12      12
P3       0        0      16       5      16      16
Here is your Gantt Chart....
P1 P1 P1 P3 P3 P3 P3 O O P2 P2 P2 P2 P4 P4 P3
Average turn_arround Time = 10.750000
Average waiting Time = 10.750000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  4
Enter the value L (0 as the low priority) and H(Max value as high priority): 0
Priority Sheduling:
```

OS Innovative Assignment



```
P3       0       5       8       5       8       3
P2       1       4      12       0      11       7
P4       3       2      14       4      11       9
Here is your Gantt Chart....
P1 P1 P1 P3 P3 P3 P3 P3 P2 P2 P2 P2 P4 P4
Average turn_arround Time = 8.250000
Average waiting Time = 4.750000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  2
Shortest Job First:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0       3       0       0       0       0
P2       1       4       0       0       0       0
P3       0       5       0       5       0       0
P4       3       2       0       4       0       0
Here is your Gantt Chart....
P1 P1 P1 P4 P4 P2 P2 P2 P2 P3 P3 P3 P3 P3
Average turn_arround Time = 6.750000
Average waiting Time = 3.250000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  3
Enter the time qaunta: 4
Enter the switch overhead: 2
```



```
C:\Users\kotad\Downloads>gcc Main.c -o Main.exe

C:\Users\kotad\Downloads>Main.exe


==========================================================

                Simulator of Sheduling Algorithms



==========================================================

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
6. Longest Remaining Time First
7. Exit

Press:  1
First Come First Served:

Process Arrival Burst Final Priority Turnarr Waiting
P1       0       3       3       0       3       0
P3       0       5       8       5       8       3
P2       1       4      12       0      11       7
P4       3       2      14       4      11       9
Here is your Gantt Chart....
P1 P1 P1 P3 P3 P3 P3 P3 P2 P2 P2 P2 P4 P4
Average turn_arround Time = 8.250000
Average waiting Time = 4.750000

1. First Come First Searved
2. Shortest Job First
3. Round Robbin
4. Priority Sheduling
5. Shortest Remaining Time First
```