1)

```
#include <stdio.h>

#define MAX_QUEUE_SIZE 100

// Structure to represent a process
typedef struct {
    int processID;
    int arrivalTime;
    int burstTime;
    int priority; // 0 for system process, 1 for user process
} Process;

// Function to execute a process
void executeProcess(Process process) {
    printf("Executing Process %d\n", process.processID);
    // Simulating the execution time of the process
    for (int i = 1; i <= process.burstTime; i++) {
        printf("Process %d: %d/%d\n", process.processID, i, process.burstTime);
    }
    printf("Process %d executed\n", process.processID);
}

// Function to perform FCFS scheduling for a queue of processes
void scheduleFCFS(Process queue[], int size) {
    for (int i = 0; i < size; i++) {
        executeProcess(queue[i]);
    }
}

int main() {
```

```
int numProcesses;
Process processes[MAX_QUEUE_SIZE];

// Reading the number of processes
printf("Enter the number of processes: ");
scanf("%d", &numProcesses);

// Reading process details
for (int i = 0; i < numProcesses; i++) {
    printf("Process %d:\n", i + 1);
    printf("Arrival Time: ");
    scanf("%d", &processes[i].arrivalTime);
    printf("Burst Time: ");
    scanf("%d", &processes[i].burstTime);
    printf("System(0)/User(1): ");
    scanf("%d", &processes[i].priority);
    processes[i].processID = i + 1;
}

// Separate system and user processes into different queues
Process systemQueue[MAX_QUEUE_SIZE];
int systemQueueSize = 0;
Process userQueue[MAX_QUEUE_SIZE];
int userQueueSize = 0;

for (int i = 0; i < numProcesses; i++) {
    if (processes[i].priority == 0) {
        systemQueue[systemQueueSize++] = processes[i];
    } else {
        userQueue[userQueueSize++] = processes[i];
    }
```

```
    }

    // Execute system queue processes first
    printf("System Queue:\n");
    scheduleFCFS(systemQueue, systemQueueSize);

    // Execute user queue processes
    printf("User Queue:\n");
    scheduleFCFS(userQueue, userQueueSize);

    return 0;
}
```

Output:

```
Enter the number of processes: 6
Process 1:
Arrival Time: 0
Burst Time: 3
System(0)/User(1): 0
Process 2:
Arrival Time: 2
Burst Time: 2
System(0)/User(1): 0
Process 3:
Arrival Time: 4
Burst Time: 4
System(0)/User(1): 1
Process 4:
Arrival Time: 4
Burst Time: 2
System(0)/User(1): 1
Process 5:
Arrival Time: 8
Burst Time: 2
System(0)/User(1): 0
Process 6:
Arrival Time: 10
Burst Time: 3
System(0)/User(1): 1
System Queue:
Executing Process 1
Process 1: 1/3
Process 1: 2/3
Process 1: 3/3
Process 1 executed
Executing Process 2
Process 2: 1/2
Process 2: 2/2
Process 2 executed
Executing Process 5
Process 5: 1/2
Process 5: 2/2
Process 5 executed
User Queue:
Executing Process 3
Process 3: 1/4
Process 3: 2/4
Process 3: 3/4
Process 3: 4/4
Process 3 executed
Executing Process 4
Process 4: 1/2
Process 4: 2/2
Process 4 executed
Executing Process 6
Process 6: 1/3
Process 6: 2/3
Process 6: 3/3
Process 6 executed
```

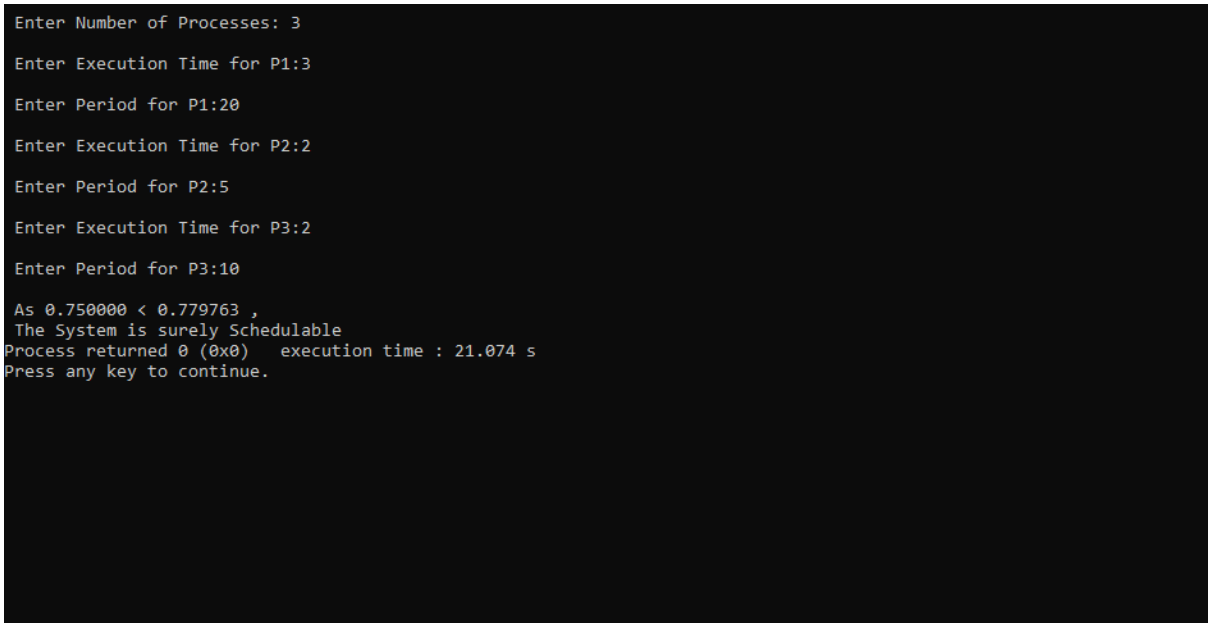
2)

```
#include<stdio.h>

#include<math.h>
```

```
int main()
{
 int n;
 float e[20],p[20];
 int i;
 float ut,u,x,y;


 printf("\n Enter Number of Processes: ");
 scanf("%d",&n);

 for(i=0;i<n;i++)
 {
  printf("\n Enter Execution Time for P%d:",(i+1));
  scanf("%f",&e[i]);
  printf("\n Enter Period for P%d:",(i+1));
  scanf("%f",&p[i]);
 }
 //calculate the utilization
 for(i=0;i<n;i++)
 {
  x=e[i]/p[i];
  ut+=x;
 }

 //calculate value of U
 y=(float)n;
 y=y*((pow(2.0,1/y))-1);
 u=y;

 if(ut<u)
```

```
 {
 printf("\n As %f < %f ,",ut,u);
 printf("\n The System is surely Schedulable");
 }
 else
 printf("\n Not Sure.....");

}
```

Output:



3)

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

#define MAX 10
```

```
int n;
int period[MAX], execution[MAX], deadline[MAX];
int ready[MAX], task[MAX];
int time = 0;

void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

int gcd(int a, int b)
{
    if (b == 0)
        return a;
    return gcd(b, a % b);
}

void sort() {
    for (int i = 0; i < n - 1; i++) {
        for (int j = i + 1; j < n; j++) {
            if (deadline[i] > deadline[j]) {
                swap(&period[i], &period[j]);
                swap(&execution[i], &execution[j]);
                swap(&deadline[i], &deadline[j]);
            }
        }
    }
}
```

```
int lcm(int arr[], int n)
{
    int ans = arr[0];
    for (int i = 1; i < n; i++)
        ans = (((arr[i] * ans)) / (gcd(arr[i], ans)));

    return ans;
}

void schedule() {
    int i, j;
    for (i = 0; i < n; i++) {
        if (time % period[i] == 0) {
            ready[i] = 1;
        }
    }
    for (i = 0; i < n; i++) {
        if (ready[i] == 1) {
            int min_deadline = 1000000000;
            int min_index = -1;
            for (j = 0; j < n; j++) {
                if (ready[j] == 1 && deadline[j] < min_deadline) {
                    min_deadline = deadline[j];
                    min_index = j;
                }
            }
            task[min_index] += execution[min_index];
            deadline[min_index] += period[min_index];
            ready[min_index] = 0;
        }
    }
```

```
}

int main() {
    int total_time;
    printf("Enter the number of processes: ");
    scanf("%d", &n);
    printf("Enter the period, execution time and deadline of each process:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d %d %d", &period[i], &execution[i], &deadline[i]);
        ready[i] = task[i] = 0;
    }
    sort();
    printf("\nOrder of execution of processes in CPU timeline:\n");
    total_time = lcm(period, n);
    while (time < total_time) { // assuming total time is 100
        schedule();
        printf("%d ", task[0]);
        time++;
    }
    return 0;
}
```

Output: