OPERATING SYSTEM
Lab – 3 Bash Scripting

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Q1 Write a C/ Python program to implement a FCFS CPU scheduling algorithm. The program should produce the ouptut sequence of the processes and waiting time for each of the process.

Also implement the average waiting time for the process sequences and display the output.

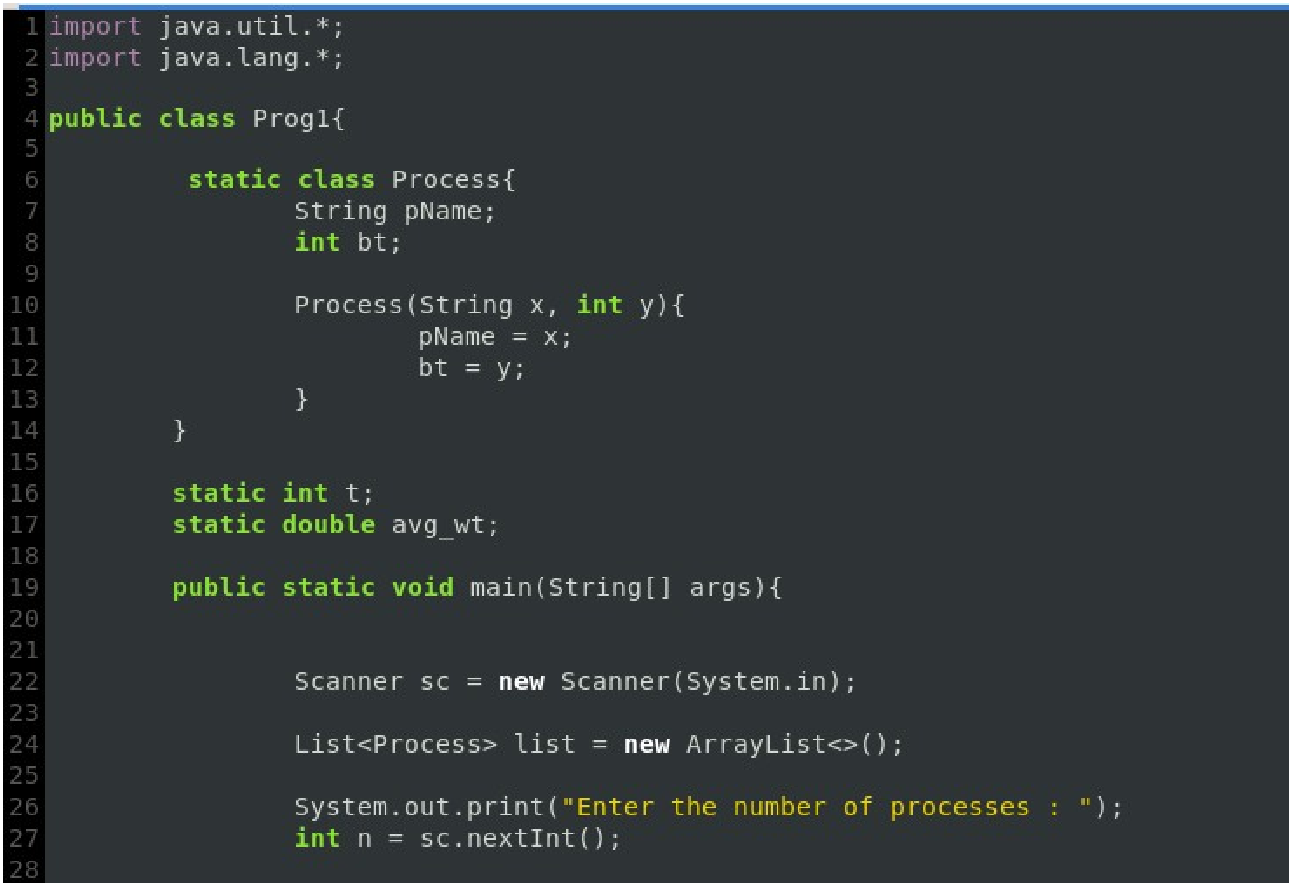
For Example: Take the input sequence for the following processes:

i)

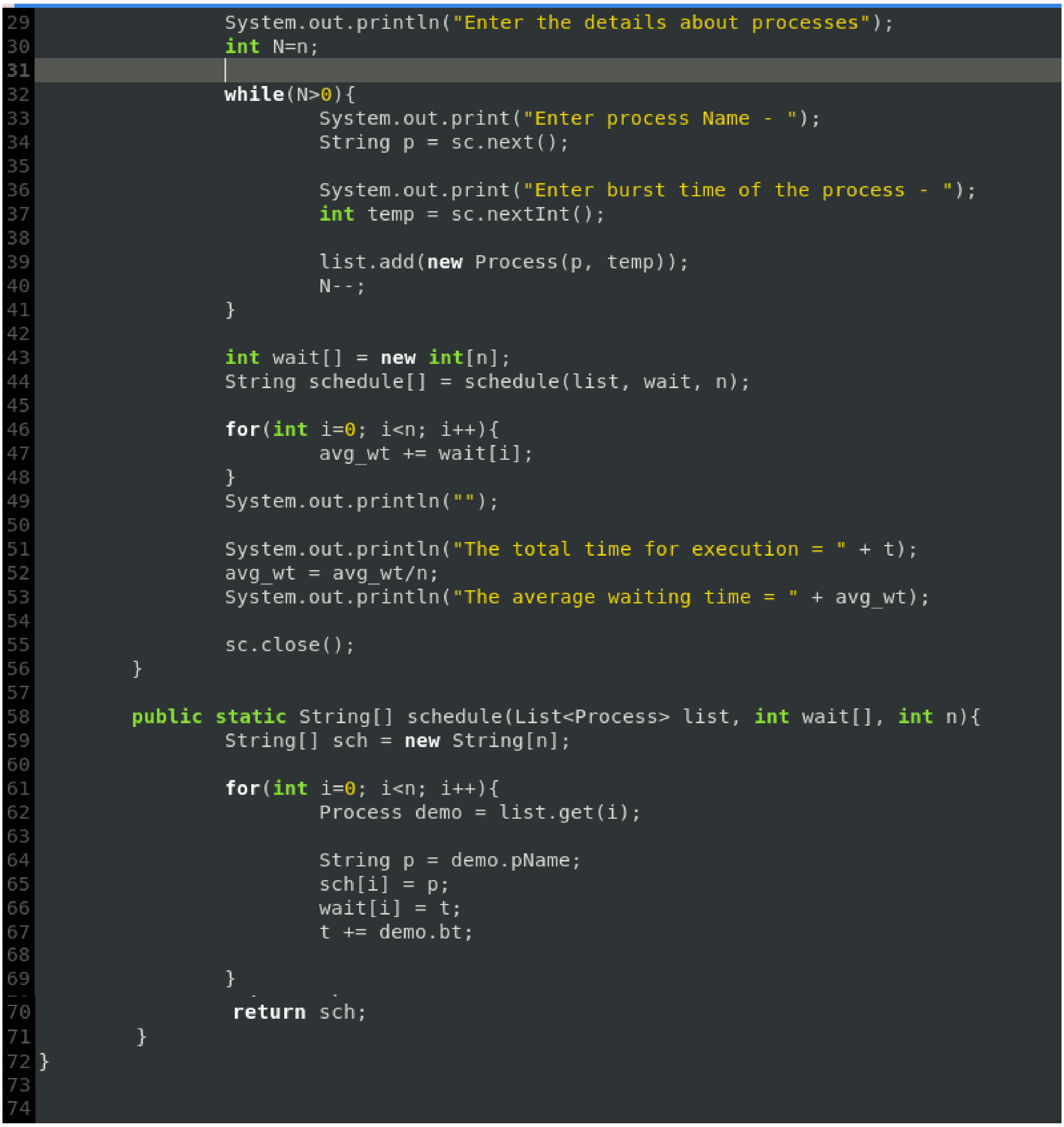
Process	Burst Time
P1	24
P2	3
P3	3

ii)

Process	Burst Time
P1	6
P2	8
P3	7
P4	3

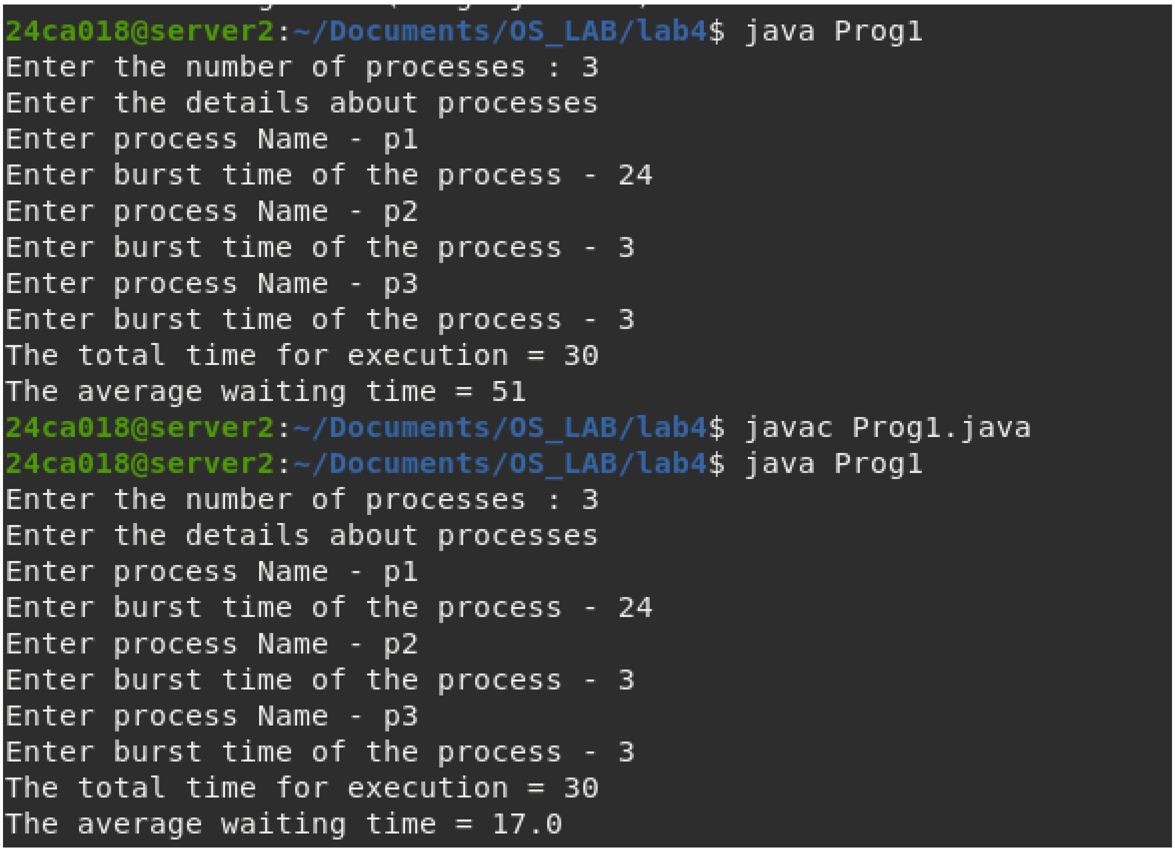


```java
import java.util.*;
import java.lang.*;

public class Prog1{

         static class Process{
                String pName;
                int bt;

                Process(String x, int y){
                        pName = x;
                        bt = y;
                }
        }

        static int t;
        static double avg_wt;

        public static void main(String[] args){


                Scanner sc = new Scanner(System.in);

                List<Process> list = new ArrayList<>();

                System.out.print("Enter the number of processes : ");
                int n = sc.nextInt();

```



```
                System.out.println("Enter the details about processes");
                int N=n;

                while(N>0){
                        System.out.print("Enter process Name - ");
                        String p = sc.next();

                        System.out.print("Enter burst time of the process - ");
                        int temp = sc.nextInt();

                        list.add(new Process(p, temp));
                        N--;
                }

                int wait[] = new int[n];
                String schedule[] = schedule(list, wait, n);

                for(int i=0; i<n; i++){
                        avg_wt += wait[i];
                }
                System.out.println("");

                System.out.println("The total time for execution = " + t);
                avg_wt = avg_wt/n;
                System.out.println("The average waiting time = " + avg_wt);

                sc.close();
        }

        public static String[] schedule(List<Process> list, int wait[], int n){
                String[] sch = new String[n];

                for(int i=0; i<n; i++){
                        Process demo = list.get(i);

                        String p = demo.pName;
                        sch[i] = p;
                        wait[i] = t;
                        t += demo.bt;

                }
                return sch;
        }
}


```

Output :



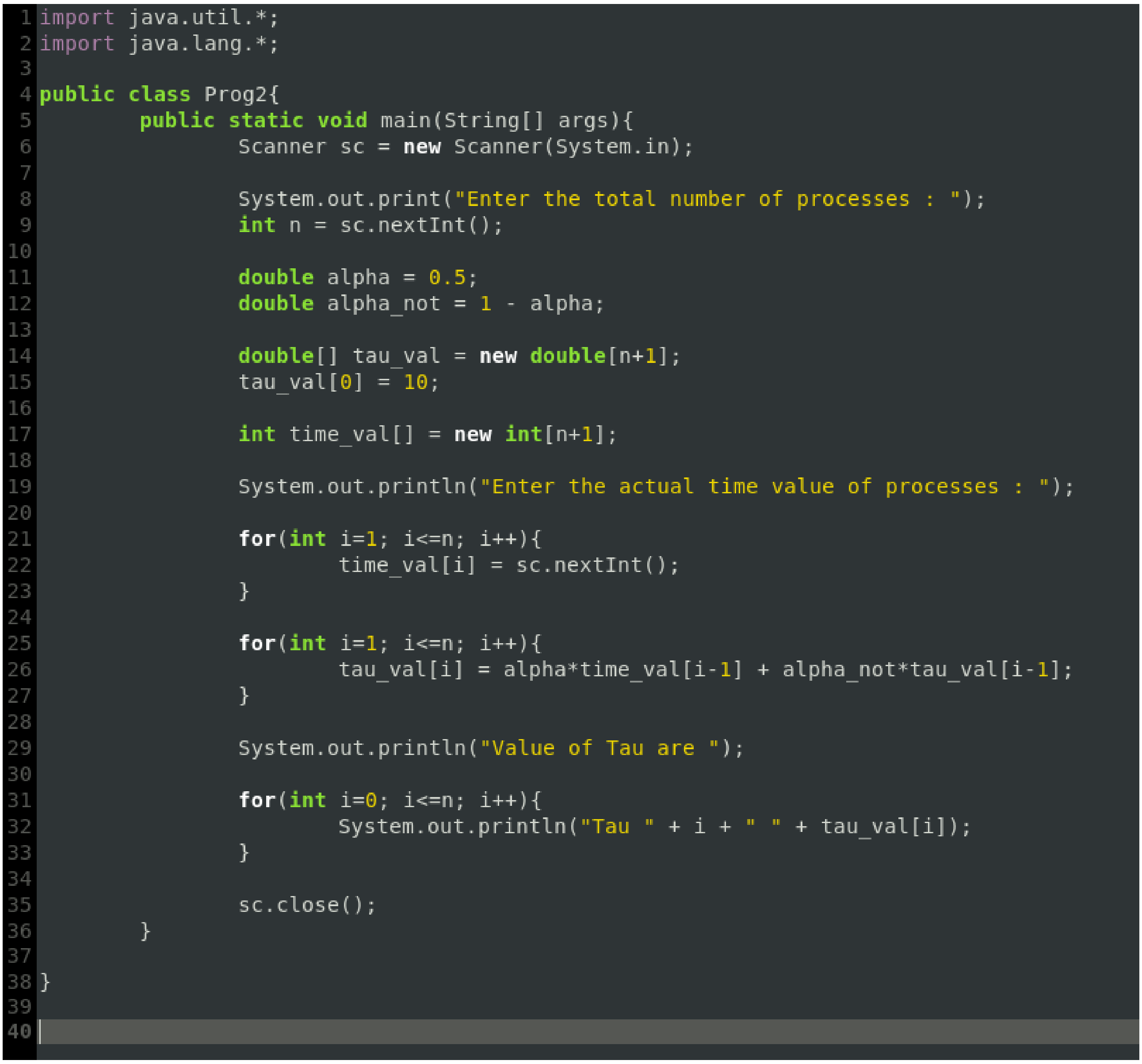
```
24ca018@server2:~/Documents/OS_LAB/lab4$ java Prog1
Enter the number of processes : 3
Enter the details about processes
Enter process Name - p1
Enter burst time of the process - 24
Enter process Name - p2
Enter burst time of the process - 3
Enter process Name - p3
Enter burst time of the process - 3
The total time for execution = 30
The average waiting time = 51
24ca018@server2:~/Documents/OS_LAB/lab4$ javac Prog1.java
24ca018@server2:~/Documents/OS_LAB/lab4$ java Prog1
Enter the number of processes : 3
Enter the details about processes
Enter process Name - p1
Enter burst time of the process - 24
Enter process Name - p2
Enter burst time of the process - 3
Enter process Name - p3
Enter burst time of the process - 3
The total time for execution = 30
The average waiting time = 17.0
```

Q2. Using the exponential averaging method which is given below for estimation of the next CPU bursts time of the process.

1. tn = actual length of nth CPU burst
2. $\tau(n+1)$= predicted value for the next CPU burst.
3. α, $0 <= \alpha <= 1$
4. Define :

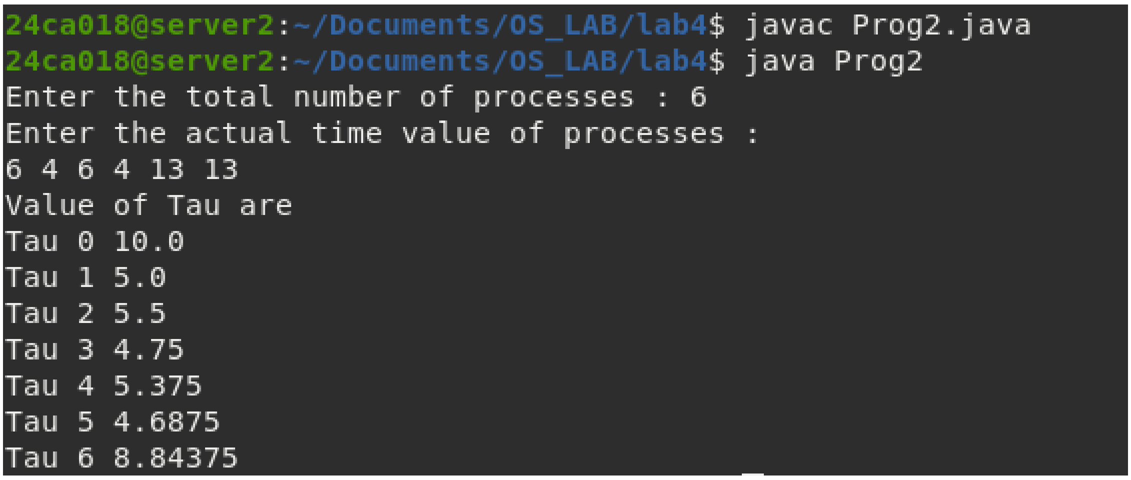
$$\tau(n+1) = \alpha*tn + (1 - \alpha)*\tau n$$

Write a C/python program to estimate the next CPU bursts time for the process. Assume the value of α is 1/2 and the initial value of $\tau 0$= 10.
The actual value of t1, t2, t3, t4, t5, t6 is 6 4 6 4 13 13.



```
import java.util.*;
import java.lang.*;

public class Prog2{
        public static void main(String[] args){
                Scanner sc = new Scanner(System.in);

                System.out.print("Enter the total number of processes : ");
                int n = sc.nextInt();

                double alpha = 0.5;
                double alpha_not = 1 - alpha;

                double[] tau_val = new double[n+1];
                tau_val[0] = 10;

                int time_val[] = new int[n+1];

                System.out.println("Enter the actual time value of processes : ");

                for(int i=1; i<=n; i++){
                        time_val[i] = sc.nextInt();
                }

                for(int i=1; i<=n; i++){
                        tau_val[i] = alpha*time_val[i-1] + alpha_not*tau_val[i-1];
                }

                System.out.println("Value of Tau are ");

                for(int i=0; i<=n; i++){
                        System.out.println("Tau " + i + " " + tau_val[i]);
                }

                sc.close();
        }

}

```

Output :



```
24ca018@server2:~/Documents/OS_LAB/lab4$ javac Prog2.java
24ca018@server2:~/Documents/OS_LAB/lab4$ java Prog2
Enter the total number of processes : 6
Enter the actual time value of processes :
6 4 6 4 13 13
Value of Tau are
Tau 0 10.0
Tau 1 5.0
Tau 2 5.5
Tau 3 4.75
Tau 4 5.375
Tau 5 4.6875
Tau 6 8.84375
```