

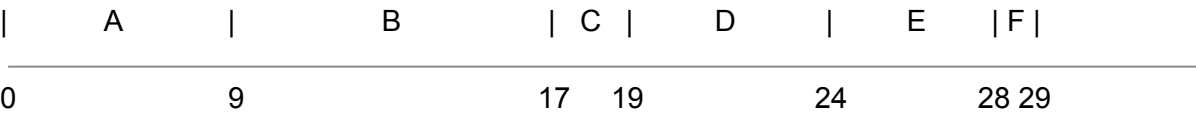
# OS Sheet 6

## Problem 1:

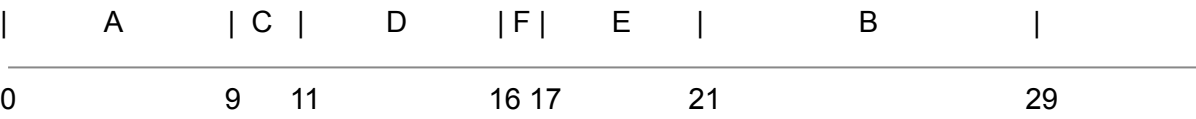
a)

Process	Arrival Time	Execution Time
A	0	9
B	4	8
C	6	2
D	8	5
E	13	4
F	15	1

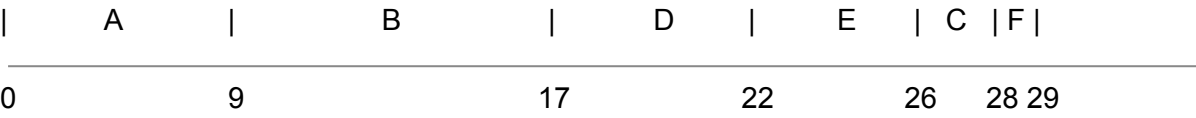
### FCFS:



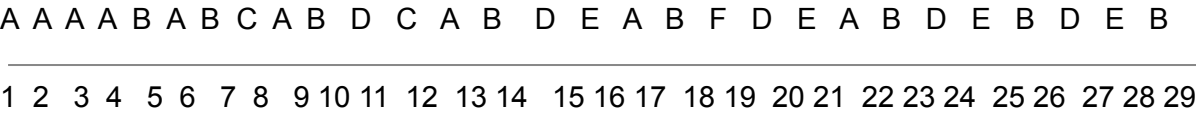
### SPTF:



### LPTF:



### RR:



b)

### FCFS:

Waiting time for:

$$\begin{aligned} A &= 0 - 0 = 0 & B &= 9 - 4 = 5 & C &= 17 - 6 = 11 & D &= 19 - 8 = 11 & E &= 24 - 13 = 11 \\ F &= 28 - 15 = 13 \end{aligned}$$

$$W_{avg} = (0 + 5 + 11 + 11 + 11 + 13) / 6 = 8.5$$

Turnaround time for:

$$\begin{aligned} A &= 9 - 0 = 9 & B &= 17 - 4 = 13 & C &= 19 - 6 = 13 & D &= 24 - 8 = 16 & E &= 28 - 13 = 15 \\ F &= 29 - 15 = 14 \end{aligned}$$

$$T_{avg} = (9 + 13 + 13 + 16 + 15 + 14) / 6 = 13.3333333$$

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### SPTF:

Waiting time for:

$$\begin{aligned} A &= 0 - 0 = 0 & C &= 9 - 6 = 3 & D &= 11 - 8 = 3 & F &= 16 - 15 = 1 & E &= 17 - 13 = 4 \\ B &= 21 - 4 = 17 \end{aligned}$$

$$W_{avg} = (0 + 3 + 3 + 1 + 4 + 17) / 6 = 4.667$$

Turnaround = Waiting + Execution

Turnaround time for:

$$\begin{aligned} A &= 0 + 9 = 9 & C &= 3 + 2 = 5 & D &= 3 + 5 = 8 & F &= 1 + 1 = 2 & E &= 4 + 4 = 8 \\ B &= 17 + 8 = 25 \end{aligned}$$

$$T_{avg} = (9 + 5 + 8 + 2 + 8 + 25) / 6 = 9.5$$

## LPTF:

Waiting time for:

$$\begin{aligned} A &= 0 - 0 = 0 & B &= 9 - 4 = 5 & D &= 17 - 8 = 9 & E &= 22 - 13 = 9 & C &= 26 - 6 = 20 \\ F &= 28 - 15 = 13 \end{aligned}$$

$$W_{avg} = (0 + 5 + 9 + 9 + 20 + 13) / 6 = \mathbf{9.33333}$$

Turnaround = Waiting + Execution

Turnaround time for:

$$\begin{aligned} A &= 0 + 9 = 9 & B &= 5 + 8 = 13 & D &= 9 + 5 = 14 & E &= 9 + 4 = 13 & C &= 20 + 2 = 22 \\ F &= 13 + 1 = 14 \end{aligned}$$

$$T_{avg} = (9 + 13 + 14 + 13 + 22 + 14) / 6 = \mathbf{14.16666}$$

## RR:

Waiting time for:

$$\begin{aligned} A &= 22 - 0 - 9 = 13 & B &= 29 - 4 - 8 = 17 & C &= 12 - 6 - 2 = 4 & D &= 27 - 8 - 5 = 14 \\ E &= 28 - 13 - 4 = 11 & F &= 19 - 15 - 1 = 3 \end{aligned}$$

$$W_{avg} = (13 + 17 + 4 + 14 + 11 + 3) / 6 = \mathbf{10.33333}$$

Turnaround = Waiting + Execution

Turnaround time for:

$$\begin{aligned} A &= 13 + 9 = 22 & B &= 17 + 8 = 25 & C &= 4 + 2 = 6 & D &= 14 + 5 = 19 & E &= 11 + 4 = 15 \\ F &= 3 + 1 = 4 \end{aligned}$$

$$T_{avg} = (22 + 25 + 6 + 19 + 15 + 4) / 6 = \mathbf{15.16666}$$

## Problem 2:

a)

File	Symbol	Internal	External	Weak	Strong
a.c	x				
a.c	y				
a.c	z				
a.c	f				
a.c	g				
b.c	x				
b.c	y				
b.c	z				
b.c	f				
b.c	g				

b)

“**Extern void f()**” is pointing to “**f()**” which is in “**b.c**” because it’s external and one in “**a.c**” is internal because of the “**static**” keyword.

“**f()**” in “**b.c**” will print “**b.c: f()**” and call “**g()**” which is in “**a.c**”

“**g()**” in “**a.c**” will print “**a.c: g()**” and call “**f()**” in “**a.c**”.

“**f()**” in “**a.c**” will finally print “**a.c: f()**”.

OUTPUT:

b.c: f()

a.c: g()

a.c: f()

c)

Name mangling is a technique to solve problems caused by the need for unique names in many programming languages(Wiki). To put it differently: Name mangling solves the problem of overloaded identifiers.

Take two functions: “***float f(int)***” and “***int f(int)***” in **C++** program. Functions have the same but different types of signatures. We can use name mangling to integrate their names so they will have different names. The linker will do this

Sometimes we don't want **C++** linker to touch **C** code. In that case, we use “***extern “C” {***” to tell the computer that's it's a **C** code and use the **C** naming and calling conventions and not the **C++** name mangling and calling conventions.