

Operating Systems Assignment - 1

All files are present in the following (including pictures and plots) [Gist](#)

1. The user I created and it's preview - pic1.png
2. the C code for the following program is the fork.c program
 2. capturing the pids can be done by using the watch command. The gif made is . since we are killing the child processes so that we don't create a fork bomb, we only see a few processes at a time, however we can see that the PID are changing (in fact increasing) which represent the child processes - g1.gif
 3. This can be done using the ctrl-C command
 4. This can be done by keeping a condition for the loop.
 5. this is in the picture - pic2.png
3. The file for this is the bmi.c file while the fork file is bmi_fork.c
 1. A child process can access the command lines arguments because when fork is called, an exact copy of the present program in a new address space, however memory is shared among them, which technically means the child process should have access to sys arguments.
4.
 1. the graphs for this are - LJF.png and SJF.png
 2. For this we have the following -

1. Case1

$$RT = 40/3+t$$

$$TT = 100/3+t$$

2. Case2

$$RT = (40+4t)/3$$

$$TT = 110/3+2t$$

3. First we find the RT and the TT.

Case1 - $n < 10$

$$\begin{aligned} RT &= (0 + (t+n) + (2t + 2n))/3 \\ &= t+n = 5 + n \end{aligned}$$

$$TT = (((2t+2n+30+(10-n)*2(10/n-1)(n+t))) + ((2t+2n+30+(10-n)*2(10/n-1)(n+t)+(20-n-(10-n)*2(10/n-1)(n+t))) + (2t+2n+30)))/3$$

substituting the values of alpha, beta, tau. we get our equation as

$$SKT = 10(5+n)^2 + 5(2n+160/3) = 10n^2 + 110n + 250+800/3$$

the projected graph is - pic3.png

Case2 - $10 < n < 20$

$$\begin{aligned} RT &= (0+10+30-n+3t)/3 \\ &= t+40/3-n/3 \end{aligned}$$

$$\begin{aligned} TT &= (10+(10+t+20+t+30+t)+(10+t+20-n+t+30))/3 \\ &= 5t/3 - n/3 + 110/3 \end{aligned}$$

substituting the values of alpha, beta, tau. we get our equation as

$$SKT = 10(55/3-n/3)^2 + 5(135/3-n/3)$$

the projected graph is - pic4.png

Case3 - $20 < n < 30$

$$RT = 40/3+t$$

$$TT = 100/3+t$$

substituting the values of alpha, beta, tau. we get our equation as

$$SKT = 10(55/3)^2 + 5(115/3)$$

the projected graph is - pic5.png

4. The Completely Fair Scheduler (CFS)