Intro to OS Exam 1

1. Reproduce the process state chart from class. (10pts)  
     
   \*Check Paper\*
2. Explain what each of the following commands do, as well as which operating system uses them (1.5 pts each):
   1. ls – short list of files within a location; Linux
   2. Cd – changes directory user is searching in; Windows and Linux
   3. Grep – used to process text; Linux
   4. Dir – used to view a list of files in a location; Windows
   5. Type – used to view contents of a file; Windows
   6. Cat – used to view contents of a file; Linux
   7. Ps – used to see the current processes running; Windows
   8. Mv – used to move a file from one location to another; Linux
   9. Robocopy – used to copy files/directories from one location to another; Windows
   10. Sed – used to move files to a different location;Linux
   11. Sudo – used to access permission to execute certain commands; Linux
   12. Chmod – used to change the modes a file is in; Linux
3. Draw a Gantt chart for the following process schedule with a Priority scheduling algorithm (quantum/delta 1) where each process gains 1 priority when it enters the CPU and a low value represents a higher priority. Include a delay of 1 unit between job changes (6pts)

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Start Time | Run Time | Base Priority |
| A | 1 | 5 | 4 |
| B | 2 | 3 | 1 |
| C | 4 | 4 | 2 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A |  |  |  |  |  | A |  |  |  |  |  | A |  |  |  |  |  | A |  |  |  | A |
|  |  | B |  |  |  |  |  | B |  |  |  |  |  | B |  |  |  |  |  |  |  |  |
|  |  |  |  | C |  |  |  |  |  | C |  |  |  |  |  | C |  |  |  | C |  |  |

1. Explain how this algorithm meet the different goals of job scheduling (fairness, efficiency, throughput, and turnaround time) .(4pts)  
     
   This algorithm is fair in regards to allowing a different process running each cycle and only allowing each process one cycle at a time. But, this causes it be less efficient because only allowing the processes one cycle at a time means there will be more overhead and take longer to complete all three tasks. Allowing each process 2 cycles in the CPU will still be fair to each process and be more efficient. In regards to throughput and turnaround time, this algorithm lacks quick turnaround time because process A began at the beginning, but didn’t finish until the end. Although process A does have the longest runtime, it should still be able finish quicker. The throughput is not long either, but could be much shorter allowing more time in the CPU for each process at a time. Overall, this algorithm is fair to each process and efficient, but could be improved by a higher quantum value.
2. What is a process control block? (2 pts) What information does it contain?(2 pts)

A process control block is a data structure that controls the scheduling of tasks through the CPU. It contains information regarding task’s ID number, priority numbers, and the current state of the process running.

1. What is an interrupt?(1pt) What is an interrupt vector?(1pt) Explain how interrupts occur and how they are handled in detail(5pts)

An interrupt is an asynchronous event, such as a mouse click, keyboard stroke, or a CD inserted. An interrupt vector is the memory location of when an interrupt occurs. Interrupts occur when an external component fails to complete its action, and they are handled immediately unless there are multiple interrupts that have occurred. If that is the case, then it is queued and dealt with based on its priority.

1. EXTRA CREDIT(.5 each): Write the permissions strings for the following values: for example,   
   777 is RWX RWX RWX:  
   666: RW-RW-RW  
   755: RWXR-XR-X  
   644: RW-R—R--   
   511: R-W—W—W

8) EXTRA CREDIT: (3 pts)  
Scientists recently discovered a group of intelligent apes in the GU Commons that appear to use food as a form of currency. The base unit is 1 chicken nugget. An ice cream cone and 4 chicken nuggets is worth the same as a burrito. An ice cream cone is worth half a burrito minus half a chicken nugget. How many chicken nuggets is 4 burritos divided by an ice cream cone?

9.33333 chicken nuggets