Operating Systems 10/14/15

Hw 3

Part A

Joseph Crandall

6.12 Lottery Scheduling

lottery scheduling

CPU

BTV Operating System

Lottery 50 times per second

Lottery winner gets 20 milliseconds of CPU time

Describe how the BTV scheduler can ensure that higher priority threads receive more attention from the CPU than lower-priority threads.

The BTV scheduler can increase the probability of a higher priority process to “win” more CPU time by issuing higher priority processes a higher percentage of the total lottery tickets per selection, which results in a higher chance of selection.

6.14 Consider the exponential average formula used to predict the length of the next CPU burst. What are the implications of assigning the following values to the parameters used by the algorithms

**Exponential Average Formula**

the length of nth CPU burst (contains the most recent information)

stores the past history

the predicted value of the next CPU burst

defined as a constant or as as an overall system average

If alpha = 1 then tau(n+1) = tn

for

a.

alpha = 0

tau naught = 100 milliseconds

tau1 = 0(100) + (1-0)taun = taun

b.

alpha = 0.99

tau naught = 10 milliseconds

tau1 =(0.99)(10) + (1-0.99)taun = 9.9 + 0.01(tau­­n)

6.15 A variation of the round-robing scheduler is the regressive round-robin scheduler. This scheduler assigns each process a time quantum and a priority. The initial value of a time quantum is 50 milliseconds. However, every time a processes has been allocated to the CPU and uses its entire time quantum (does not block for I/O), 10 milliseconds is added to its time quantum, and its priority level is boosted. (The time quantum for a process can be increased to a maximum of 100 milliseconds.) When a process blocks before using its entire time quantum, its time quantum is reduced by 5 milliseconds, but its priority remains the same. What type of process (CPU-bound or I/O-bound)dies the regressive round-robin scheduler favor? Explain.

CPU-bound – generates I/O requests infrequently, using more of its time doing computations.

I/O bound – An I/O bound process is one that spends more of its time doing I/O than it spends doing computations.

Regressive round robin favors CPU-bound processes because it progressively grants these processes more CPU time.

6.23

Consider a preemptive priority scheduling algorithm based on dynamically changing priorites. Larger priority number imply higher priority. Whan a process is waiting for CPU (in the ready queue, but not running), its priority changes at a rate alpha. When it is running, its priority changes at a rate beta. All processes are given a priority of 0 when they enter the ready queue. The parameters alpha and beta can be set to give many different scheduling algorithms.

1. What is the algorithm that results from beta > alpha > 0

First come, first serve

1. What is the algorithm that results from alpha < beta < 0

Last in first out