CS1356 Introduction to Information Engineering

Quiz 5, 2010/11/01

Your name_____ Student ID_____

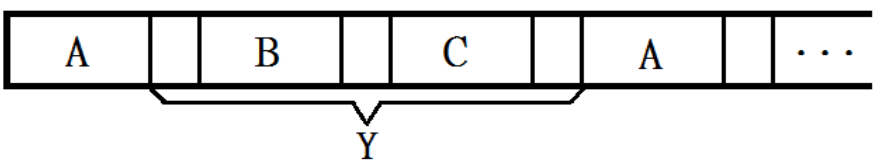
1. What is **real-time process** and what is **multiprogramming**?
   Real-time process is a process that has a **deadline**, before which it need be done.
   Multiprogramming is a technique that divides time into **intervals**, and executes several tasks in turns in different time intervals.

2. What is a **program** and what is a **process**? What is their relation?
   A program is a **set** of instructions.
   A process is a **dynamic activity** whose properties change as time progresses.
   A process is the activity of executing a program.

3. What is an **interrupt** in a computer system? What can trigger an interrupt? Please give two examples.
   When OS gets an interrupt, it will stop the execution of current process and check what happens.
   The end of current time slice, clicking mouse, pressing keyboard, or an I/O request, etc.

4. There are **processes A, B, and C**. The **execution time** for A, B, and C are **5 seconds, 10 seconds, and 20 seconds**. If each time slice on a multiprogramming operating system OS1 is **50 milliseconds** (50×10^{-3}) and each context switch requires **100 microseconds** (100×10^{-6}), how much **time** does process **A stay in OS1** until A is completed? Assume that A, B, and C are started on OS1 at the same time and will be executed in the order A, B, C, A, B, C…… and so on.

   Process A needs 5seconds/50milliseconds = $5/(50*10^{-3})$ = 100 time slices.
   So that we can know that A will have **99 context switches** before finished.
   The problem tells us that processes would be executed in the order A, B, C. See the following figure:



   By figure, we regard the time between two time slices of A as **Y**, so it have 99 Y to finish A. Time spent on Y is :
   100microseconds*3 + 50milliseconds*2 = 0.3 + 100 = 100.3milliseconds
   Finally, the answer is
   5seconds + 100.3milliseconds*99 = 14.9297seconds