



**National University of Computer and Emerging Sciences Islamabad**  
**Data Structures (Fall 2014)**

**Assignment: 3 and 4**

**Version: 1**

**Open Date: 27<sup>th</sup> Oct, 2014**

**Due Date: 16<sup>th</sup> Nov, 2014 (5:00PM)**

**Submission Date: 16<sup>th</sup> Nov, 2014 (11:55PM)**

**Max Marks: 100**

**Sections: All**

## **INSTRUCTIONS**

- ❖ Submit your codes (one text file containing all the code) on SLATE. No other file is accepted. A sample file is attached for your assistance.
- ❖ Failing to submit the code in the required format, you will get a '0'.
- ❖ Name your text file as Section\_RollNumber\_Assignment2 (F\_13-1234\_A3\_A4)
- ❖ Plagiarised code will be awarded an F grade.
- ❖ Submission through SLATE messages or Email will not be accepted.
- ❖ Remember there are always marks to follow guidelines.
- ❖ Note that the due date is 16<sup>th</sup> Nov, 2014 (5:00PM) and the submission date is 3rd Nov, 2014 (11:55PM). So you have total of 6 to 7 hours to submit your assignment on slate. No exception or any issue will be entertained.

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### **Objective:**

**Implement the Process Scheduling Simulator for the following scheduling algorithms.**

- **FCFS (First Come First Serve)**

For FCFS you will use simple queue.

- **Round Robin (RR)**

For RR you will use circular queue. CPU context switch time is 10ms. Processes will be run for the context switch time and moved back to the queue to allow next process to run. If a process finishes its required CPU time, then it will be removed from the queue and next process will be run.

- **Completely Fair Scheduler (CFS)**

For CFS you can use AVL/RBT. For AVL, your tree will be constructed based on the CPU time i.e. a process with smaller CPU time will be added to left sub-tree and vice versa. You can use in-order traversal on the tree to find next process.

You are required to implement a process scheduler that takes as input the number of processes and their information.

**Process information:**

Process ID = 1004

Arrival Time = 13:33:45:0500 (HH:MM:SS:ssss)

CPU Time = 60 ms

## Example

**Step 1:**

-----User Input Menu-----

User Input:

No. of processes:

Every Process Information:

**Step 2:**

Select Scheduler Technique from Given Menu:

-----Scheduler Menu-----

-----FCFS: 1-----

-----RR: 2-----

-----CFS: 3-----

-----Exit: 4-----

Enter Choice: 1

-----FCFS-----

Show all the working of FCFS

-----Scheduler Menu: 1-----

-----User Input Menu: 2-----

-----Exit: 3-----

Enter Choice: 1

So on...

**Other Instructions:**

- You must use C++ and it's compulsory to use Microsoft Visual Studio 2010 or any latest version.
- The code must be properly commented and this carries marks too.
- Do test your program thoroughly and make sure it gives correct output before submitting.
- If your program does not compile or works, you do not get credit.
- You will not be allowed to debug your program during the demo.
- Excuses like "it was working before but we don't know what happened to it now" will not be entertained.

**Helping Links:**

- [http://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/3\\_Processes.html](http://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/3_Processes.html)
- [http://www.tutorialspoint.com/operating\\_system/os\\_process\\_scheduling\\_algorithms.html](http://www.tutorialspoint.com/operating_system/os_process_scheduling_algorithms.html)