SFWR ENG 4AA4

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Note: information from the pre-requisite, [SFWR ENG 3DX4](https://drive.google.com/open?id=0BxW61uJyyN8TUjN2X0dwbVBkTVk) will not be included in this summary (although corrections will be).

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# Real-Time Systems

## Classifications

What happens upon failure to meet deadlines:

* **Soft**: performance is degraded but not destroyed
* **Firm**: a few times will simply degrade performance, but after may lead to system failure
* **Hard**: complete and catastrophic system failure
  + **Safety Critical**: may cause injury / death (a type of hard)

**Forward difference method**: derivatives using 

**Backwards Difference method**: derivatives using 

**Controller** [C(s)]:

**Input** [E(s)]:

**Output** [U(s)]:





# Task optimization

**Task** [T]: 

**Period** [p]: time between tasks are repeatedly released

**Release time** [r]: time it takes to release task

**Execution time** [e]: slowest time task could take to be completed (but assume the tasks will take this long no matter what)

**Deadline** [d]: when task needs to be completed

If ri = 0 and pi = di, then write *Ti* = (*pi* , *ei* )

# Types of Scheduling

## **FIFO**

**First In First Out (FIFO)**:

* Could cause problems for tasks whose execution time is significantly shorter than the rest when there are deadlines
  + E.g. T1 = (100, 3); T2 = (2, 1)
* A.K.A. **First Come, First Served (FCFS)**

**Frame Size**:

**Schedule**: the order in which tasks will be executed