REAL-TIME CLASSIFICATIONS

- **Hard Real-time Tasks**

  - A hard real-time system is one in which failure to meet even a single deadline may lead to complete or catastrophic system failure.
  - In a hard real-time system, a missed deadline creates not only a complete loss of value but also a negative value, i.e., harm.
  - The task deadlines are in the order of micro or milliseconds.
  - Many hard real-time systems are safety critical
  - Examples:
    - Industrial Control Applications
    - On-board computers
    - Robots

- **Firm Real-time Tasks**

  - Firm real-time tasks are such type of real-time tasks which are associated with time bound and the task need to produce the result within the deadline.
  - In a firm real-time system, a few missed deadlines will not lead to total failure, but missing more than a few may lead to complete or catastrophic system failure.
  - Although firm real-time task is different from hard real-time task as in hard real-time once deadline is crossed and task is not completed, system fails but in case of firm real-time task even after the passing of deadline, system does not fail.
  - Example:
    - Video conferencing
    - Satellite based tracking

- **Soft Real-time Tasks**

  - Soft real-time tasks are such type of real-time tasks which are also associated with time bound but here timing constraints are not expressed as absolute values.
  - In a soft real-time system, performance is degraded but not destroyed by failure to meet response-time constraints.
  - In soft real-time tasks, even after the deadline result is not considered incorrect and system failure does not occur.
  - Example:
    - Web browsing
    - Railway Ticket Reservation