MS Windows 10 CPU Scheduling

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Submitted To

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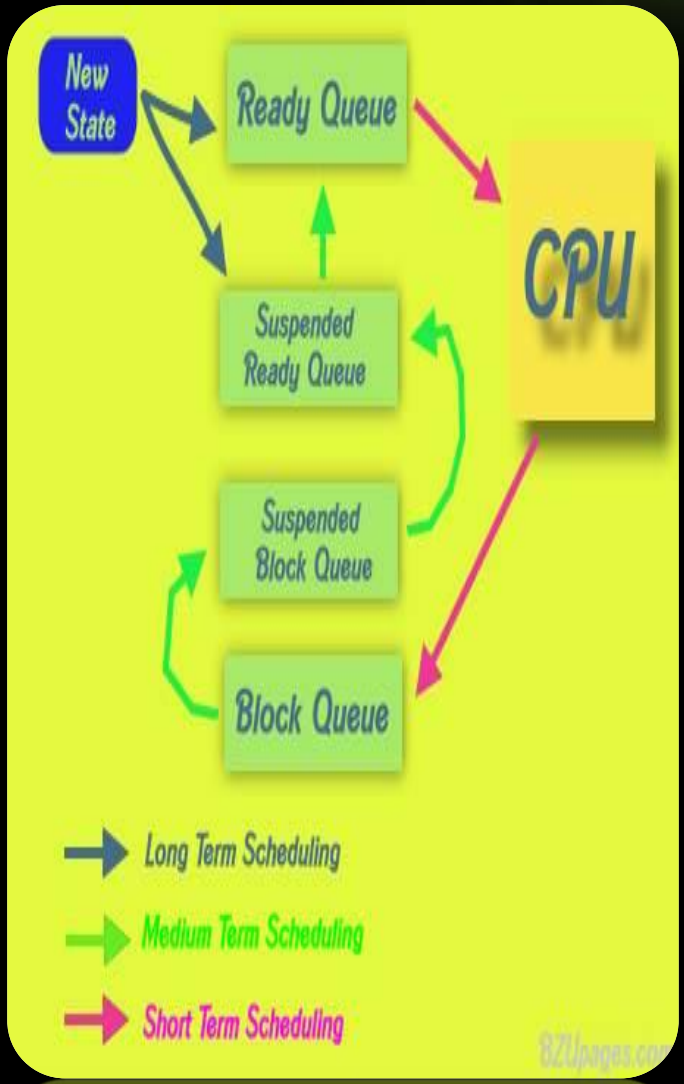


Introduction

❖What is cup Scheduling

- CPU scheduling is a process which allows one process to use the CPU while the execution of another process is on hold(in waiting state).

- The aim of CPU scheduling is to make the system more efficient, fast and fair.

- CPU scheduling decisions may take place when a process:

  1-Switches from running to waiting state.

  2- Switches from running to ready state.

  3 - Switches from waiting to ready.

  4-Terminates.

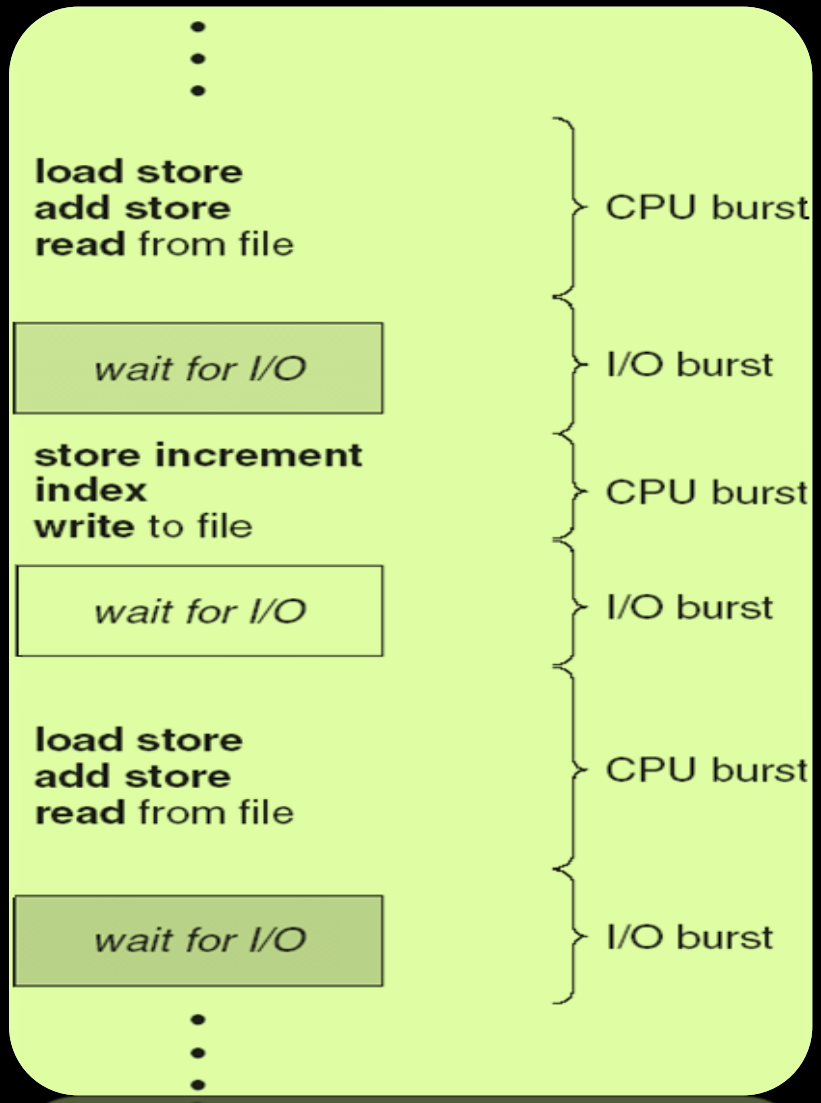
objective

- To introduce CPU scheduling, which is the basis for multi-programmed operating systems.
- To describe various CPU-scheduling algorithms.
- To discuss evaluation criteria for selecting a CPU scheduling algorithm for a particular system.

Basic Concepts

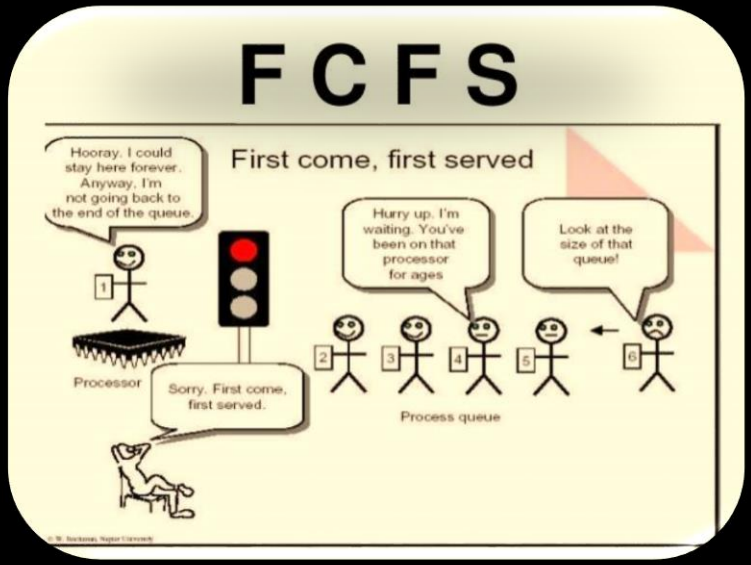
- Maximum CPU utilization obtained with multiprogramming
- Scheduling of the CPU is fundamental to operating system design
- Process execution consists of a cycle of a CPU time burst and an I/O time burst (i.e. wait)
- Processes alternate between these two states (i.e., CPU burst and I/O burst).
- Eventually, the final CPU burst ends with a system request to terminate execution

Alternating Sequence of CPU and I/O Bursts



Type of scheduling

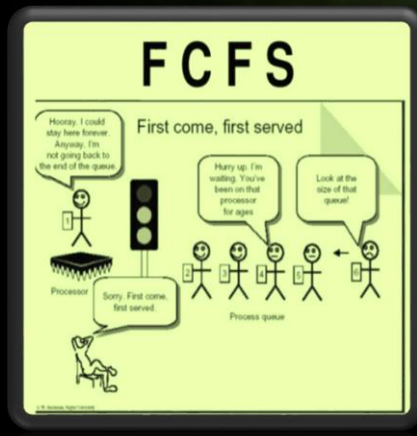
- **Single CPU Scheduling**
  - First Come, First Served (FCFS).
  - Shortest-Job-First (SJF).
  - Priority Scheduling.
  - Round Robin (RR).



- **Multilevel CPU Scheduling**
  - Multilevel Queue Scheduling.
  - Real-time: EDF and RM.

Single CPU Scheduling

❖First Come, First Served (FCFS).

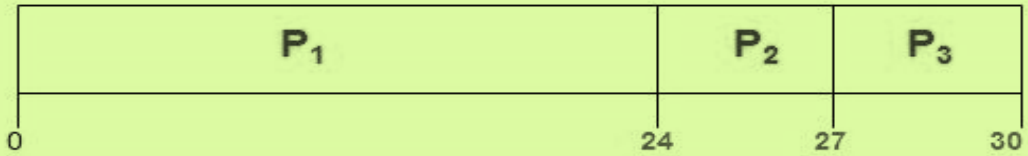


- Jobs are executed on first come, first serve basis.
- Easy to understand and implement.
- Poor in performance as average wait time is high.

➢ Example of (FCFS)

Process	Burst Time
P_1	24
P_2	3
P_3	3

- Suppose that the processes arrive in the order: P_1, P_2, P_3
  The Gantt Chart for the schedule is:



- Waiting time for P_1 = 0; P_2 = 24; P_3 = 27
- Average waiting time: (0 + 24 + 27)/3 = 17

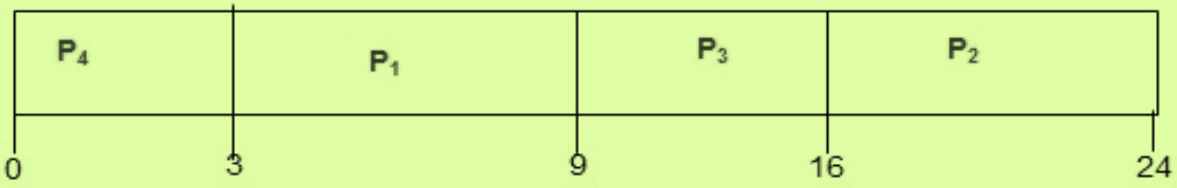
Shortest-Job-First (SJF)

- Best approach to minimize waiting time.
- Actual time taken by the process is already known to processor.
- Impossible to implement.

➢ Example of SJF

Process	Arrival Time	Burst Time
P_1		6
P_2		8
P_3		7
P_4		3

- SJF scheduling chart



- Average waiting time = (3 + 16 + 9 + 0) / 4 = 7

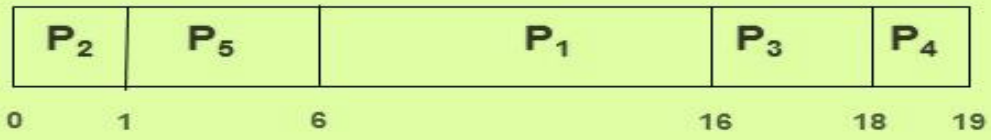
Priority Scheduling

- Priority is assigned for each process.
- Process with highest priority is executed first and so on.
- Processes with same priority are executed in FCFS manner.
- Priority can be decided based on memory requirements, time requirements or any other resource requirement.

➢ Example of Priority

Process	arri Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	4
P_4	1	5
P_5	5	2

- Priority scheduling Gantt Chart

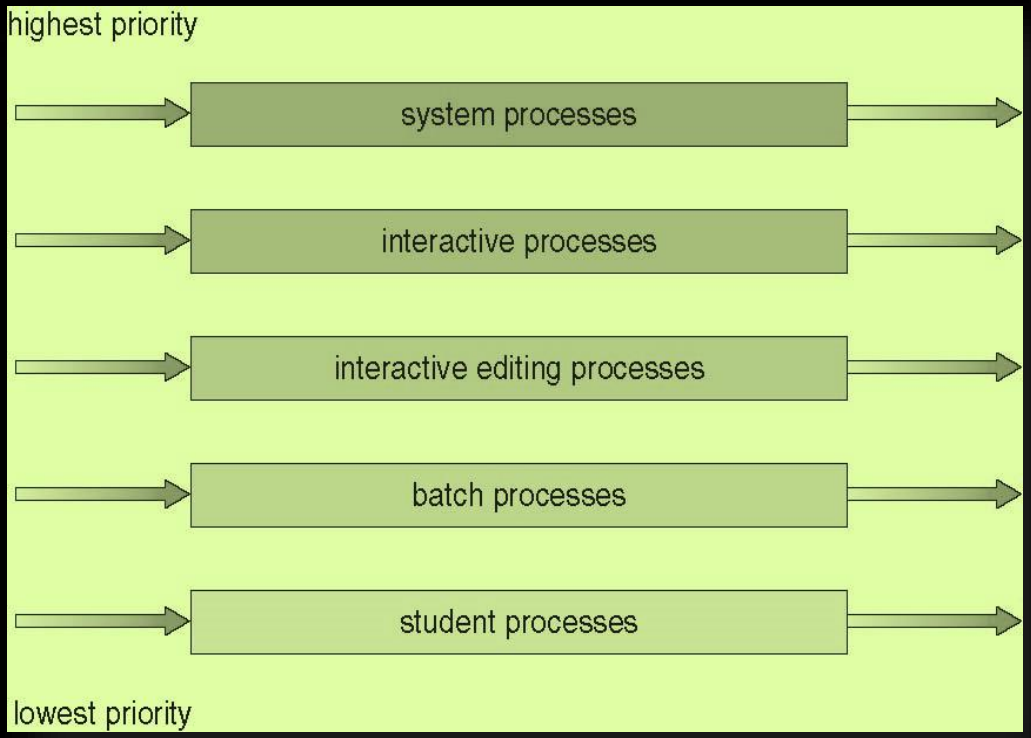


- Average waiting time = 8.2 msec

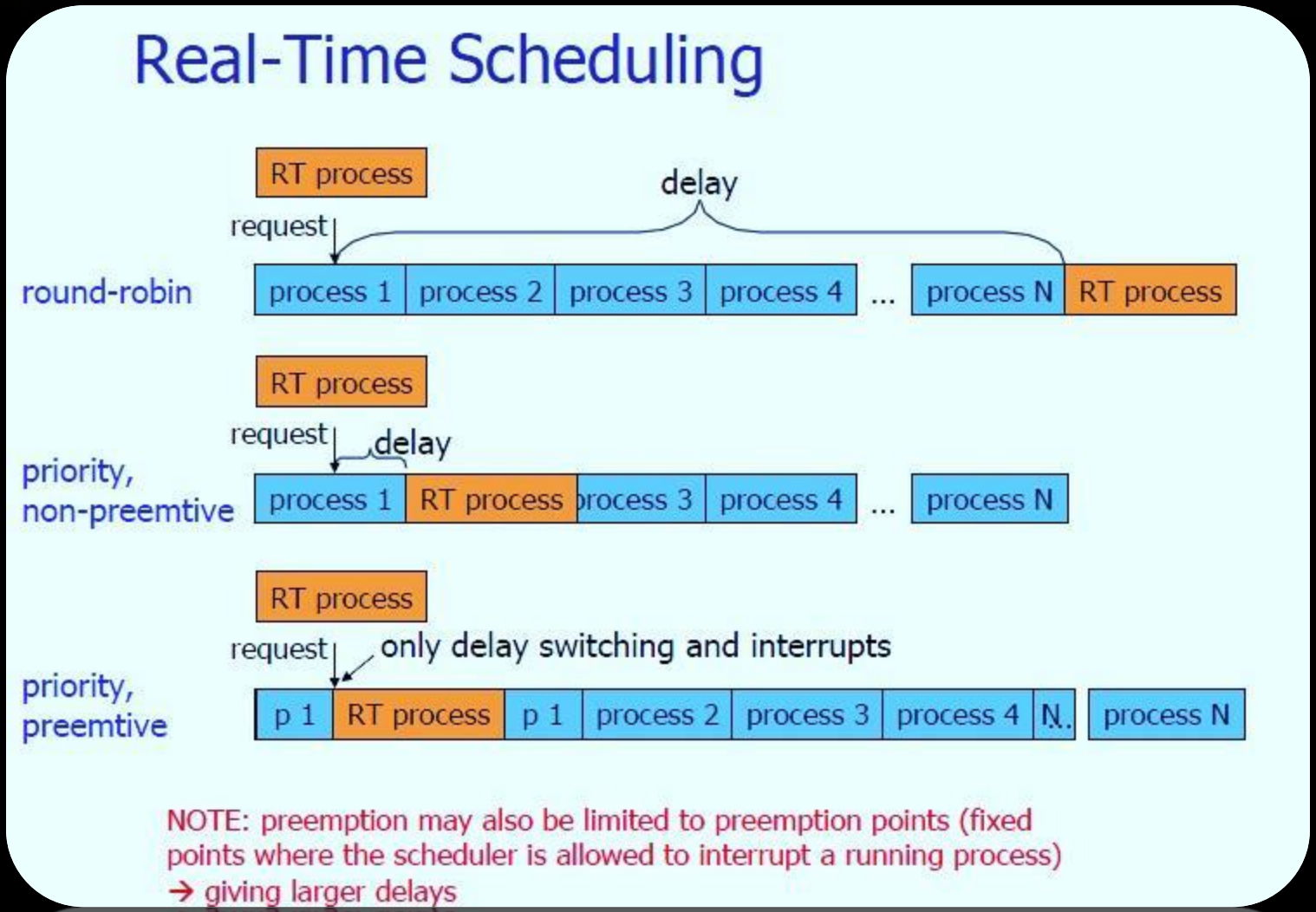
Multi level CPU Scheduling

❖Multilevel Queue Scheduling

- Multiple queues are maintained for processes.
- Each queue can have its own scheduling algorithms.
- Priorities are assigned to each queue.



Real Time


Real-Time Scheduling
RT process
delay
request
round-robin
process 1
process 2
process 3
process 4
...
process N
RT process
RT process
request
delay
priority,
non-preemtive
process 1
RT process
process 3
process 4
...
process N
RT process
request
only delay switching and interrupts
priority,
preemtive
p 1
RT process
p 1
process 2
process 3
process 4
N.
process N
NOTE: preemption may also be limited to preemption points (fixed
points where the scheduler is allowed to interrupt a running process)
→ giving larger delays

Windows Scheduling

- Windows scheduled threads using apriority-based,preemptive scheduling algorithm.
- The scheduler ensures that the highest priority thread will always run.
- The portion of the Windows kernel that handles scheduling is called the dispatcher.
- The dispatcher uses a 32-level priority scheme to determine the order of thread execution.

Windows Scheduling

- Priorities are divided into two classes.
- The variable class contains threads having priorities 1 to 15.
- The real-time class contains threads with priorities ranging from 16 to 31.

- There is also a thread running at priority 0 that is used for memory management.

- The dispatcher uses a queue for each scheduling priority and traverses the set of queues from highest to lowest until it finds a thread that is ready to run.

Windows Scheduling

- If no ready thread is found,the dispatcher will execute a special thread called the idle thread.

- Priorities in all classes except the read-time priority class are variable.

  - This means that the priority of a thread in one of these classes can change.

- The initial priority of a thread is typically the base priority of the process that the thread belongs to.

Windows Scheduling

- When a user is running an interactive program, the system needs to provide especially good performance for that process.
- The priority of each thread is based on the priority class it belongs to and its relative priority within that class.
- Within each of the priority classes is a relative priority as shown below.

Windows Scheduling

PRIORITY	real-time	high	above normal	normal	below normal	idle priority
time-critical	31	15	15	15	15	15
highest	26	15	12	10	8	6
above normal	25	14	11	9	7	5
normal	24	13	10	8	6	4
below normal	23	12	9	7	5	3
lowest	22	11	8	6	4	2
idle	16	1	1	1	1	1

Processor Scheduling in Windows 10

- Depending on the usage of your Windows 10 computer, you can configure processor scheduling, so that it gives you the best performance while using Programs or for Background Processes You can make this adjustment easily via the Control Panel.

Task Scheduler in windows 10

- The Task Scheduler in Windows 10 Gives You More Power

- automates any app, including maintenance, alarm clocks, and more. In Windows10,Battery Saver mode modifies the Task Scheduler to use less energy.

Task Scheduler in windows 10

- The Task Scheduler in Windows10 executes scripts or programs at specific times or after certain events (we refer to these as triggers or conditions.) It's useful as a maintenance or automation tool.

- Strong against any virus attack

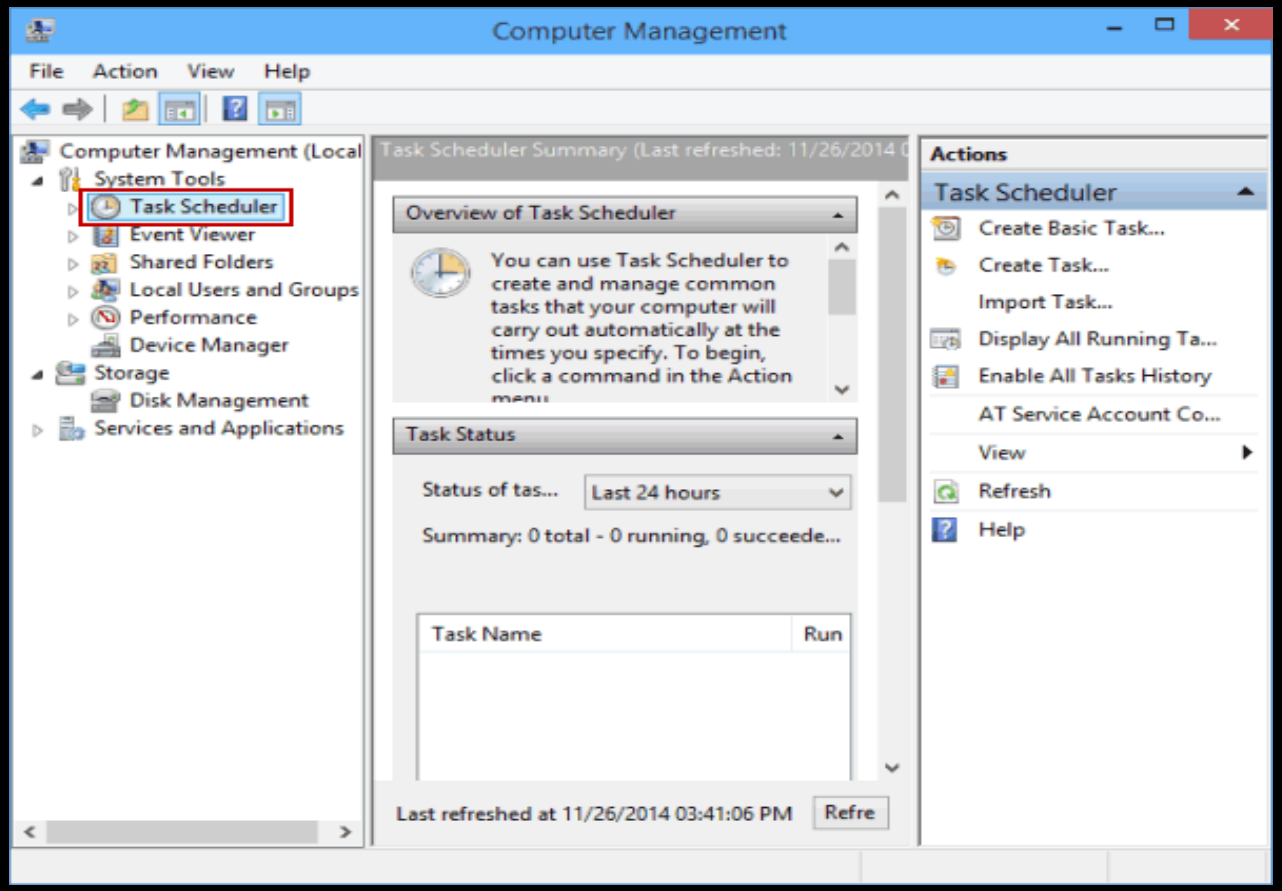
- Can You Extend Battery Life with Windows 10 Battery Saver? Working with Windows 10 and want to conserve your laptop's battery life?

- Check out Battery Saver to make sure you're getting the most out of every charge.
  - The task is set to trigger when the computer is idle.
  - The task is set to run during automatic maintenance.
  - The task isn't set to run when the user is logged on.

ways to open Task Scheduler in Windows 10

❖ Open Task Scheduler in the Computer Management.

- Step 1: Open Computer Management.
- Step 2: Click Task Scheduler on the left.

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