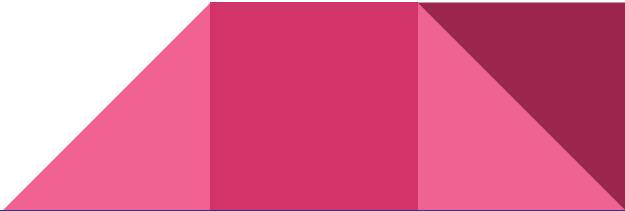




# Types of real-time operating systems

## PLAN :

1. What is a Real-Time Operating System
  2. Types of RTOS
  3. Difference and advantages of Types of RTOS
  4. Conclusion
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# What is a Real-Time Operating System (RTOS)?

**Real-time operating system (RTOS)** is an operating system intended to serve real time application that process data as it comes in, mostly without buffer delay. The full form of RTOS is Real time operating system.

In a RTOS, Processing time requirement are calculated in tenths of seconds increments of time. It is time-bound system that can be defined as fixed time constraints. In this type of system, processing must be done inside the specified constraints. Otherwise, the system will fail.



An operating system is basically, a program that acts as an interface between the system hardware and the user. Moreover, it handles all the interactions between the **software and the hardware**.

The real-time operating systems are used in real-time systems where the time constraints are fixed and followed strictly. This means that the time for processing and responding is very small. Moreover, the system should perform the given task in a fixed time otherwise, it results in a system failure.



# Types of RTOS

There are three types of real-time operating systems. They are as follows:

## 1. Hard Real-Time Systems

In this, the time constraint is very short and strict. Even seconds of delay is not acceptable. Therefore, it is compulsory to complete the task within the given time only.

Examples are Airplanes systems, Medical treatment systems, etc.



## **2. Firm Real-Time Systems**

In these systems, although the deadline is given but, missing them does not result in great loss. There can be some unwanted side effects in the system if the deadline is not followed.

Examples are multimedia systems.

## **3. Soft Real-Time Systems**

As the name suggests, the system handles the deadlines softly. This means that if there are small delays in the system, it is acceptable.

Examples are Online Transaction systems, Livestock price quotation systems, Computer games, etc.



<b>Hard Real-Time System</b>	<b>Soft Real-Time System</b>
<p>These systems have to follow the deadline very strictly.</p>	<p>These systems do not have fewer restrictions on the deadline.</p>
<p>The size of the data file is either small or medium.</p>	<p>On the other hand, soft real-time systems have large data files.</p>
<p>The response time is in milliseconds.</p>	<p>Comparatively, the response time is higher.</p>
<p>These systems strictly emphasize safety.</p>	<p>Safety is not so strict in these systems.</p>
<p>Examples are satellite launch systems, missile launch systems, Railway systems, etc</p>	<p>Examples are computer games, online transaction systems, etc.</p>

<b>Firm Real-Time System</b>	<b>Soft Real-Time System</b>
<p>The system should complete the task before the deadline.</p>	<p>It also has to complete the task within the deadline but, not strictly.</p>
<p>In case, it gives the results after the deadline it has zero importance.</p>	<p>If it gives the results after the deadline, the importance decreases and slowly goes to zero value.</p>
<p>If the results are given after the deadline, they are considered as incorrect.</p>	<p>On the other hand, even if the system gives the results after the deadline they are not considered incorrect.</p>
<p>Multimedia applications use such systems. Practical systems make less use of them.</p>	<p>It is mostly used in practical applications.</p>
<p>Examples are multimedia systems etc.</p>	<p>Examples are computer games, online transaction systems, etc.</p>



## CONCLUSION

- RTOS is an operating system intended to serve real time application that process data as it comes in, mostly without buffer delay.
  - It offers priority-based scheduling, which allows you to separate analytical processing from non-critical processing.
  - Important components of RTOS system are: 1)The Scheduler, 2) Symmetric Multiprocessing, 3) Function Library, 4) Memory Management, 5) Fast dispatch latency, and 6) User-defined data objects and classes
  - Three types of RTOS are 1) Hard time 2) Soft time ,and 3) Firm time
  - RTOS system occupy very less memory and consume fewer resources
  - Performance is the most important factor required to be considered while selecting for a RTOS.
  - General-Purpose Operating System (GPOS) is used for desktop PC and laptop while Real-Time Operating System (RTOS) only applied to the embedded application.
  - Real-time systems are used in Airlines reservation system, Air traffic control system,etc.
  - The biggest drawback of RTOS is that the system only concentrates on a few tasks.
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