

Mr. Bhabesh Kumar :

(1)

Q1). What is real time system? Explain with an example.

ans 1). A real time system must deliver its services basic on time; the time boundation with each application is must.

→ Real time system is different from general purpose computer system basis on functionality.

These facilities are useful in real time, embeded system, interactive system and network system. So examples of real time applications in real life like when we drive the car the real time system control the engine and brakes of our car and regulate the traffic light. Another example when we fly, maintain its flight path etc.

→ Real time system is used when the complexity of general purpose computer system has increased. A typical real time system is divided into the parts like:

(a) Controlling system :

The controlling system is a computer that acquires information about the environment through input devices like sensors, perform computation in the data like actuators and activates the actuators through some controls.

(b). Controlled system :

(2)

Controlled system is the part of real time system that maintain the status of the system using condition.

(c) Environment :

Environment lead to a portion of a system can be run; if mismatch between the state of the environment is perceived by the controlling system and the actual state of the environment.

⑥ Characteristics of Real Time Systems:

- ①. Real time computation is very fast.
- ②. Real time system operates in static environments.
- ③. Real time system determine the predictability.
- ④. Many real time system are use of generally as generally purpose computer systems.

Q2. Explain Various ^{Real time system} timing constraints of a job? Explain with example. (3)

Solⁿ :- Timing Constraints :- In real time system the timing constraints define the time behaviour of a job. So the timing constraints specifies the timing specification using different parameters. The timing constraints also refer to the term they are required to perform execution of real time application. The timing constraints specifies by release time, relative deadline, response time and absolute deadline. Based on the properties the timing constraints classified in two categories.

1. Hard Timing Constraints
2. Soft Timing Constraints

• Hard Timing Constraints :-

Hard timing constraints specifies the timing behaviour of a hard time system. They define the characteristic of a hard real time system by which we denote that the system to be hard.

• Soft Timing Constraints :-

Soft timing constraints specifies the timing behaviour of soft real time system. They refer that execution of real time application after deadline. They also define characteristics of soft real time system by which we denote the system is to be soft.

Timing Constraints are as following :-

1. Release Time :- Release time refers to the instant of time at which job become available for execution. (4)

2. Deadline :- Deadline is the time limit which assigned to a job. It is instant of time at which the job execution is complete.

VIII Sem CSE (Real time system)

Ques (6) What is periodic task model? Explain period, execution of periodic task.

Solution: -

A periodic task model defines the periodic task. It's a well known deterministic model used for the hard real time system like digital control, real time monitoring etc.

The periodic task model define the periodic task T_i by using 4 tuple (ϕ_i, P, e, D_i) where

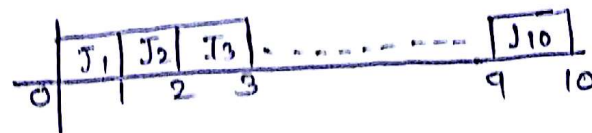
$\phi_i \rightarrow$ phase of a task

$P \rightarrow$ period of task

$e \rightarrow$ execution of task

$D_i \rightarrow$ Relative deadline of task

- ① Period : In periodic task model every data and computation is executed repeatedly at regular and semi-regular time interval respectively with junction of a system.



Period (P_i): 1

- ② Execution time : The execution time of a periodic task is equal the release denoted by e_i .

⑥

The amount of time that is needed for the execution of a periodic task is known as execution time.

⑤ Phase : The phase (ϕ_i) of a periodic task is equal to the release time of a first job in task.

Actually a periodic task is the set of different jobs. The each job has own release time. So the first job release time denoted the phase of a task.

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Ques ⑤ A system contain three tasks and execution times in periodic task are 1, 2, 3, and their periods.

ans $\Rightarrow$ Given parameters are as follows:

Three task T_1, T_2, T_3 .

	c_i	P_i
T_1	1	3
T_2	2	4
T_3	3	10

i, Utilization, $U = c/P$

$$U_1 = \frac{c_1}{P_1} = 1/3 = 0.33$$

$$U_2 = \frac{c_2}{P_2} = 2/4 = 0.50$$

$$U_3 = \frac{c_3}{P_3} = 3/10 = 0.30$$

Total Utilization,

$$U = U_1 + U_2 + U_3$$

$$= 0.33 + 0.50 + 0.30$$

$$= 1.13 \underline{\quad}$$