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End-to-end timing analysis of a distributed embedded system



Assignment 4: End-to-end timing analysis of a distributed embedded system

The requirements are as follows.

- The system should consist of two nodes that are connected by one CAN network
- Select the network speed of your choice conforming to the standard CAN protocol
- The network must contain at least 3 messages
- There must be at least one multi-rate distributed chain in the system
 - The chain must have at least two tasks in each node
 - The chain must be interfered by at least one task in each node. The interfering task(s) should not be part of the chain
 - The message in the chain must be the lowest priority message in the network
 - Use one precedence constraint between any two tasks in the system
 - Specify one age and one reaction constraint from the start to the end of the chain
- Assume message and task parameters yourself



Assignment 4: End-to-end timing analysis of a distributed embedded system

- Use the assumptions discussed in the corresponding lecture as follows
 1. No offsets
 2. Within a multi-rate chain, the priority of any task is not higher than the priority of its predecessor task within the same node
 3. Receiving tasks use polling policy to receive messages from the network
 4. Receiving tasks “just miss” the read access of the messages

- (a) Identify the age and reaction delays using a time line graph
- (b) Calculate the age and reaction delays mathematically
- (c) Are the specified age and reaction constraints satisfied?
- (d) What could be the consequences or complexities of not using the above assumptions? Explain for each assumption (1-4) separately.