

Vision Computer Coding Assignment

The system is comprised of the following:

- Main storage;
- 3 tasks: Task_10, Task_20 and Task_40;
- A Consumer (**not implemented by you, but be aware of its presence**);

Main Storage:

Main storage contains (stores) 6 fields of type `float`:

- x,y,z coordinates, valid values between -1.0 and 1.0
- roll, pitch, yaw angles, in radians, valid values between $-\pi$ and π .
roll: rotation around the x axis
pitch: rotation around the y axis
yaw: rotation around the z axis

Tasks:

The tasks (running in parallel threads) **communicate with each other directly** and **update the Main Storage** as follows:

Task_10 wakes up every 10ms, and does the following:

- Reads incoming messages from other tasks and updates Main storage with new data received
- Sends a message to Task_20 every 20ms
- Sends a message to Task_40 every 40ms

Task_20 wakes up every 20ms, and does the following:

- Reads incoming messages from other tasks and updates Main storage with new data received
- Sends a message to Task_10 every 20ms
- Sends a message to Task_40 every 40ms

Task_40 wakes up every 40ms, and does the following:

- Reads incoming messages from other tasks and updates Main storage with new data received
- Sends a message to Task_10 every 40ms
- Sends a message to Task_20 every 40ms

Please note the timing of the tasks.

The following table summarizes the piece of information being sent between tasks, depending on the source task and the destination task:

	Task10	Task20	Task40
Task10	----	z	roll
Task20	x	----	pitch
Task40	y	yaw	----

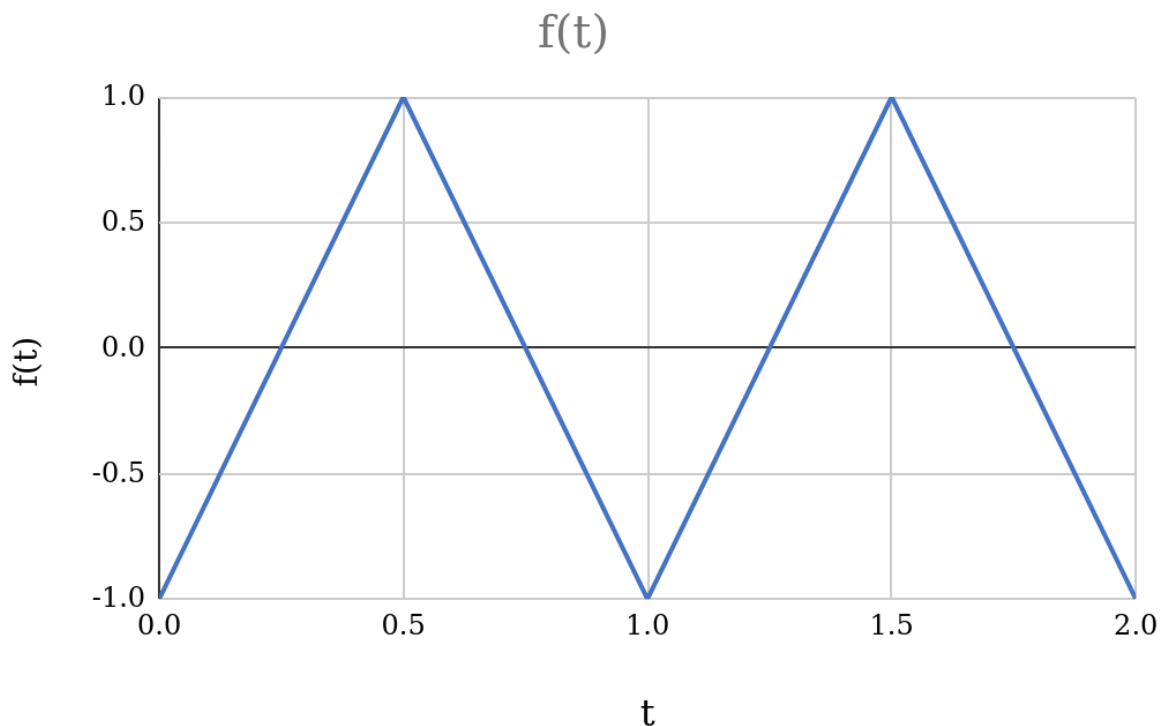
Source, Destination

e.g.:

- A message from Task20 to Task10 contains the x coordinate
- A message from Task20 to Task40 contains an angle around the y axis (pitch)

The task message shall contain the intended piece of information (according to the table above). Each source task shall generate the intended piece of information, such that it oscillates linearly with time between the lowest boundary of the valid range (see “Main Storage”) and the highest boundary of the valid range. The period of oscillation (low->high->low) shall be 1 second.

e.g.: The valid range for the x coordinate is $[-1,1]$, so the message payload of Task_20 to Task_10 will look like the following over time (the chart contains 2 seconds’ worth of data):



Consumer (Do not implement, but be aware of its existence in your design):

A periodic task that wakes at some (undisclosed) interval and reads data from the Main Storage.