

**Department of Electrical and Computer Engineering
Stony Brook University**

ESE 501 System Specifications and Modeling (Fall 2009)

Project Task No. 1

This assignment is **due October 20, 2009 in class**. No electronic copy will be accepted.

Description: Implement in SystemC to do the following:

- The map is divided in grid. We assume there are 64 grids in square map. The grids are divided in 4 clusters. Each cluster has 1 BS robot and 4 MS robots. Thus, there are 4 BS robots and 16 MS robots. The robots are navigated with a sequence of indices. Therefore, a path is defined as a list of grid indices. There is one server that controls all robots.
- Each BS robot moves every T_b seconds by 1 grid. Within this time period, each MS robot moves 16 grids. Each MS robot moves a grid every T_c seconds. Thus $16T_s = T_b$.
- Each time after all MS robots are navigated to a new grid, all MS robots listen for a signal to recorded is the signal is received or not. The signal is generated by the BS robots in round robin. Since there are 4 clusters (4 BS robots), each T_c is divided into 4 slots. Let's define this time period as T_s . Hence, $4T_s = T_c$.
- Initially, the server contains all the navigation paths as well as communication ordering. The server talks to BS robots and the BS talks to MS robots within the cluster. Therefore, 4 BS robots talk to their own MS robots.
- First, server sends the signal to a BS robot to move one grid. Then the BS robots sends back the ACK indicating that it is moving. The server waits for some time and send the signal asking if the BS robots is moved and in position. The BS robot responds back. This is repeated for 3 other BS robots.
- Second, the server sends the signal to a BS robot to navigate the MS robots. It follows the same protocol described above.
- Third, once the MS robots are in position, the server tells the BS robots to send broadcast signal in order. The MS robots recorded the signal.
- When the entire grids are covered by the MS robots, the BS moves one grid and repeat the entire process.