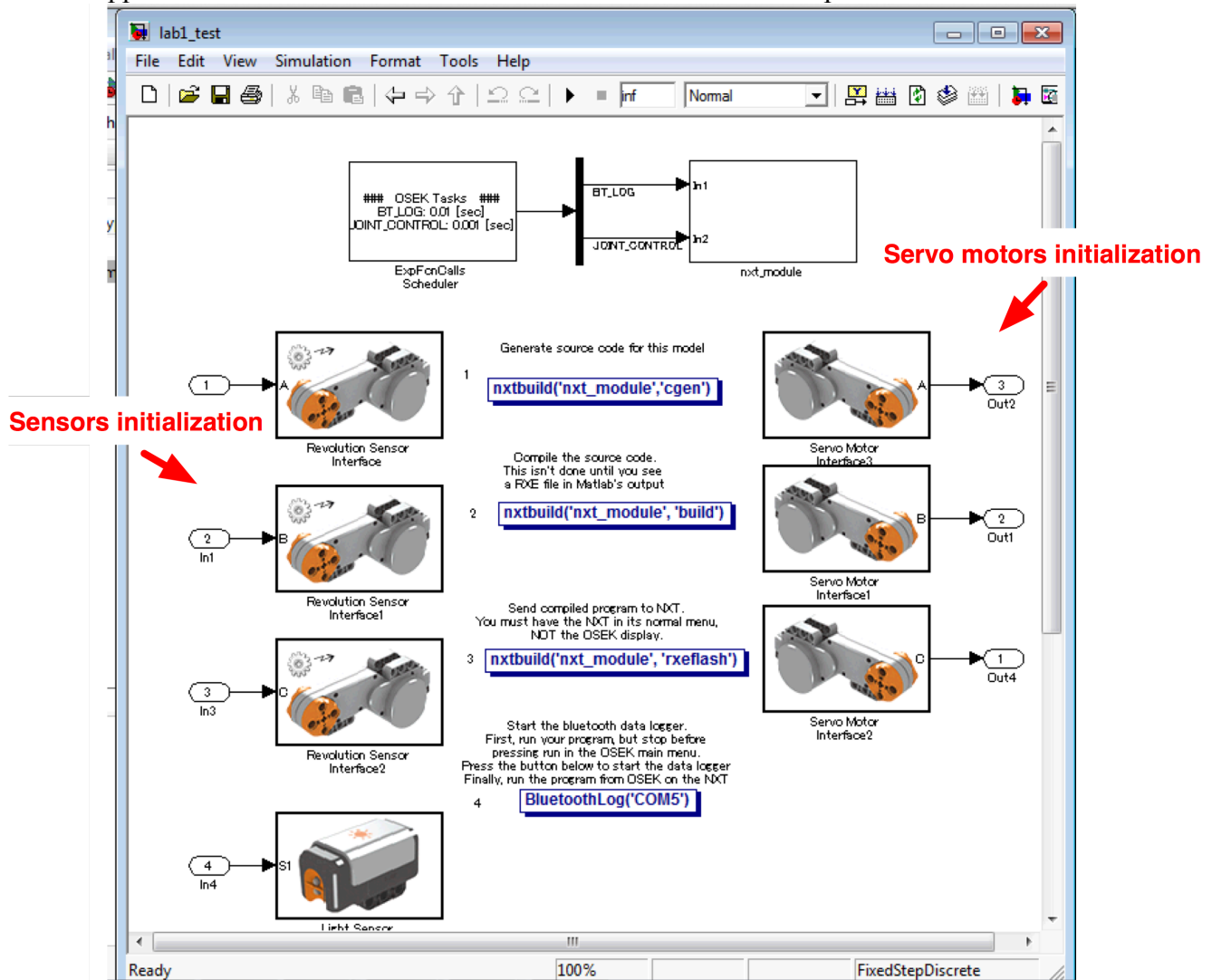


How to build your own Simulink control model for the Lego NXT

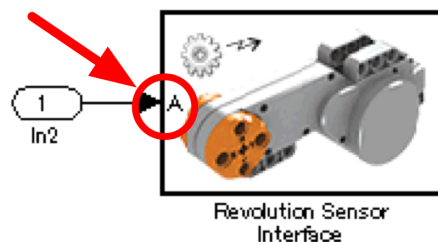
The goal of this lab is to build controllers for the Lego NXT robots using Matlab and Simulink. To make your life simple, we prepared a Simulink template (template.mdl) that you can modify to accommodate your needs.

Let us see how the file is structured.

On the upper level we initialize all the sensors and the motors that are present in our robot.

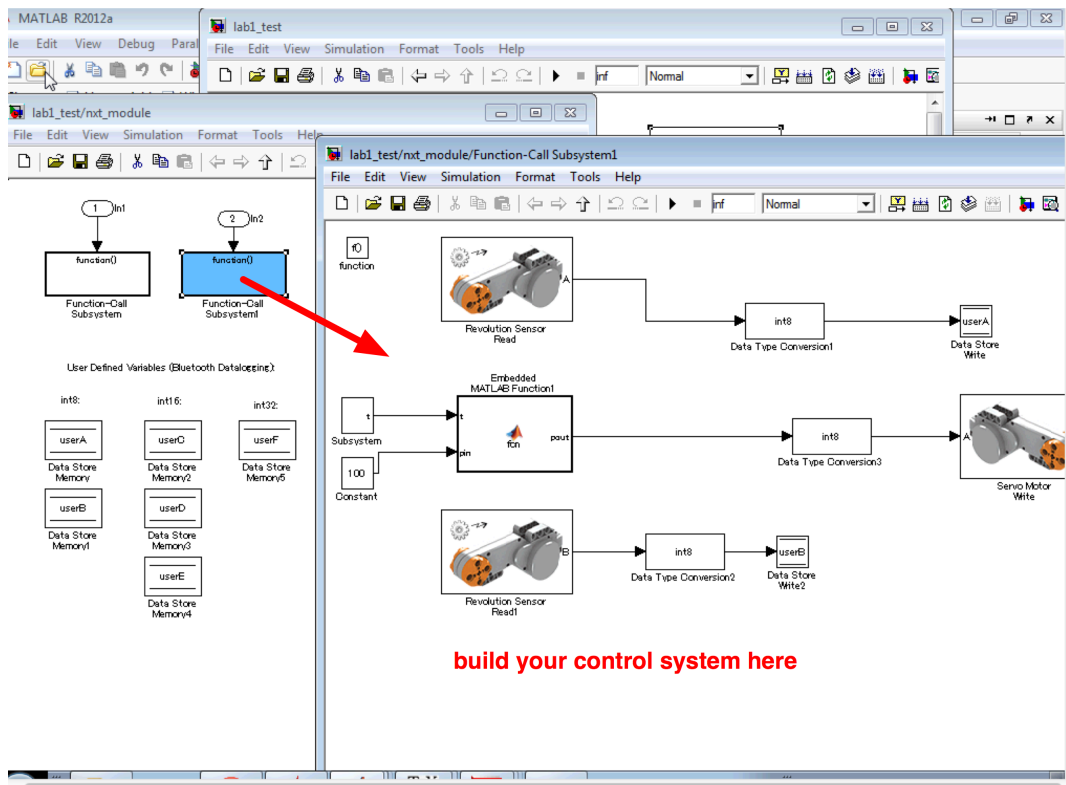
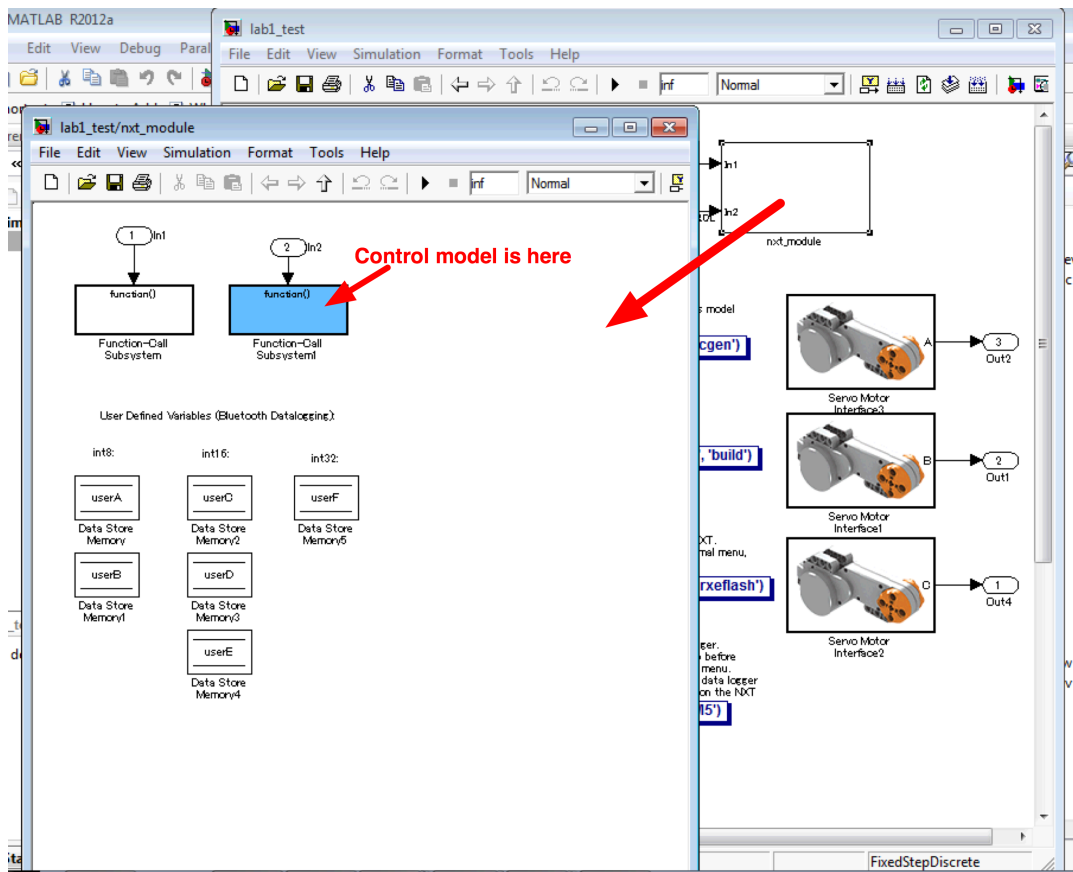


Port on the NXT block

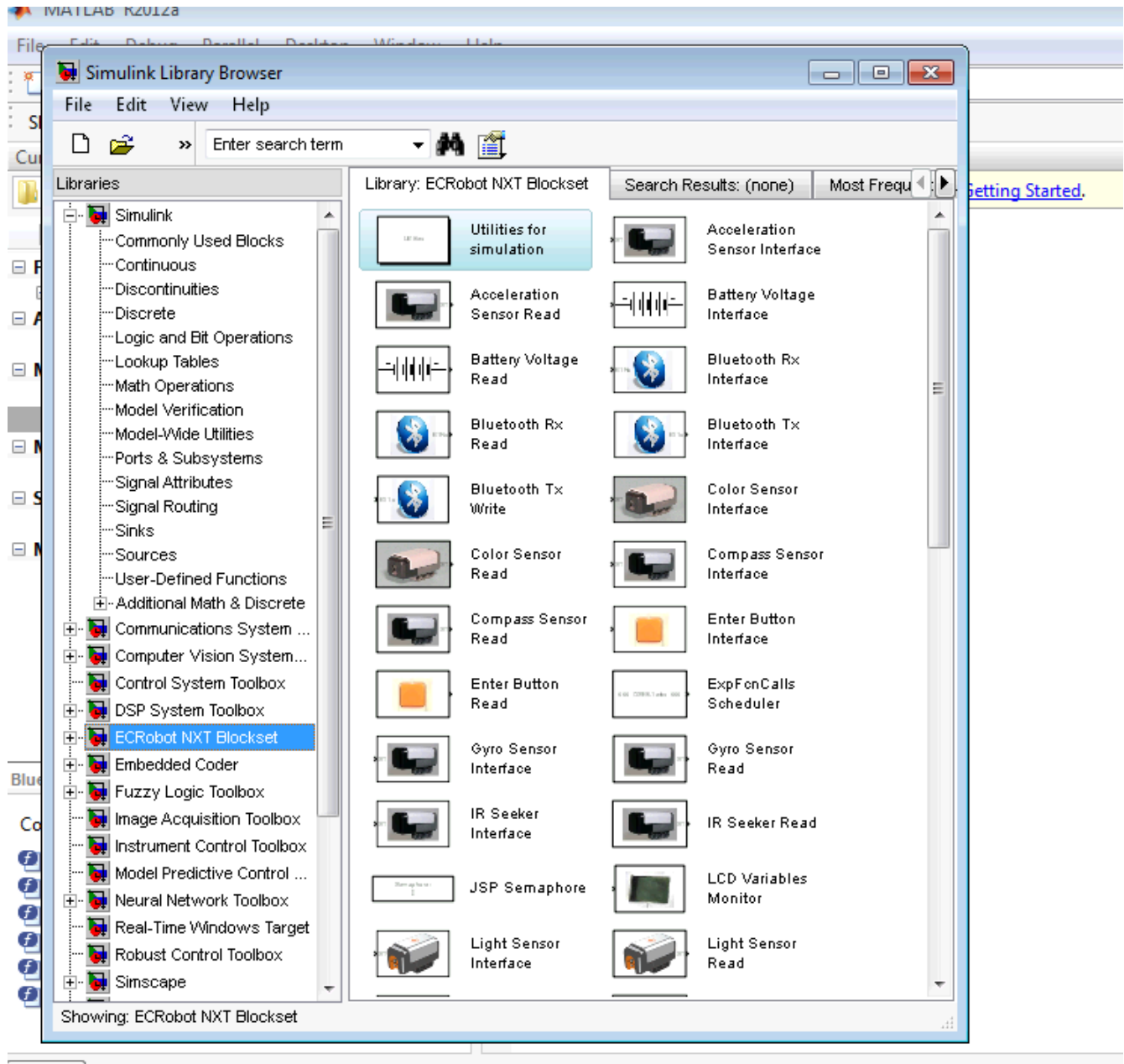


Encoder interface

The control model is inside the blue block “Function-Call Subsystem”



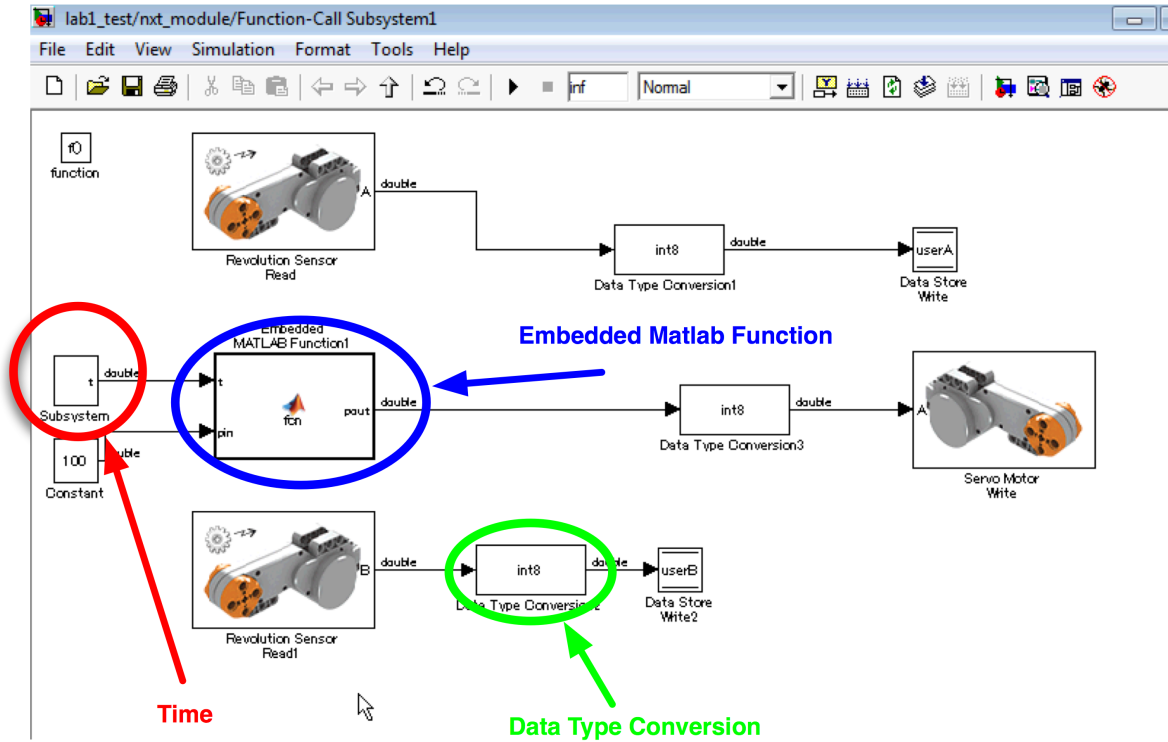
You can find the blocks to build your control system in the Simulink Library browser:



You can also use the standard Simulink blocks (sums, logic blocks etc). However, you can NOT use blocks that require an internal time (e.g., sinewave, square wave, etc.).

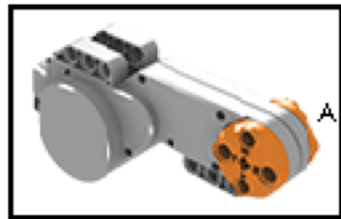
How to generate sinewaves, square waves... then?

The subsystem *t* keeps track of the time (we encourage you to open it and figure out how it works!), while in the Embedded Matlab Function block you can write the code to generate a the desired function using the input time *t* (again, explore it!)

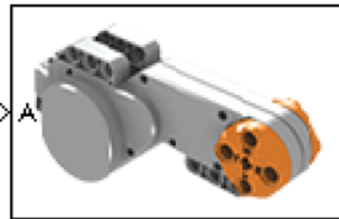


The Data Type issue:

Different sensors input/output different data types (int8, uint8...). It is then VERY IMPORTANT to convert from one data type to another. To do so, you can use the Data Type Conversion block.

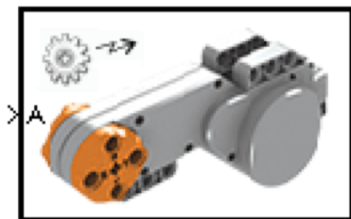


Servo Motor Interface

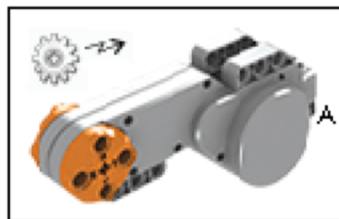


Servo Motor Write

int8



Revolution Sensor Interface

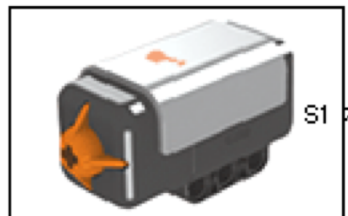


Revolution Sensor Read

int32

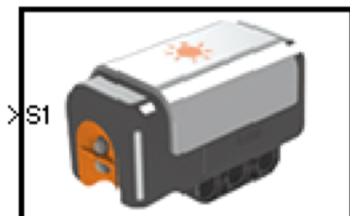


Touch Sensor Interface

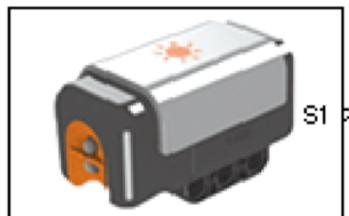


Touch Sensor Read

uint8



Light Sensor Interface



Light Sensor Read

uint16