This is the READ ME file to run versions of the simulations presented in:
Boucher, L., Palmeri, T. J., Logan, G. D., & Schall, J. D. (2007). Inhibitory control in mind and brain: An interactive race model of countermanding saccades. *Psychological Review*.

The code runs in Matlab (the code requires the Statistics toolbox). We hope that the code is
sufficiently commented throughout so that everything is clear. But we regret that cannot support
this code in any way. Also note that we have not included any of the code used to find best-
fitting parameters. Users will need to find their own optimization routines.

This code should not be used for any type of clinical purposes.

The user can specify the following variables:
1. interactive race model or independent race model
2. the stop signal delays
3. the parameters of the model

The program outputs a figure that looks like this:
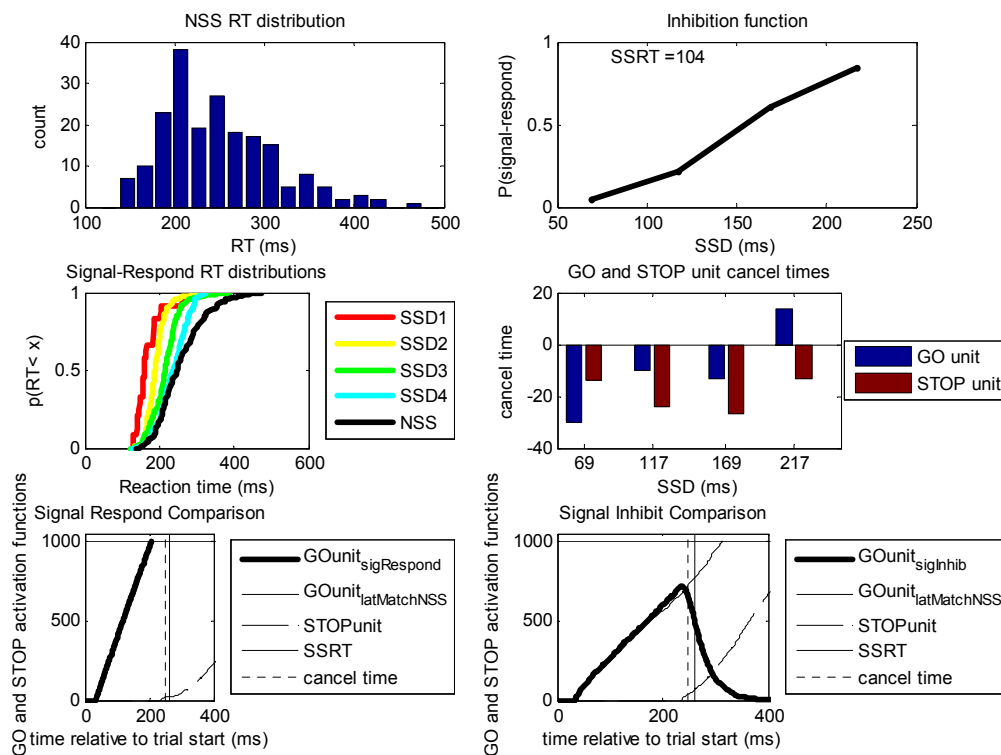
NSS RT Distribution : RT distribution of No Stop Signal trials.

Inhibition Function : Probability P(signal-respond) is the probability of responding to the primary task (i.e., failing to stop) as a function of stop signal delay (SSD)

Signal-Respond RT distributions : cumulative RT distributions for signal-respond trials for no stop signal trials (NSS) and for trials at each stop signal delay (SSD1-SSD4)

GO and STOP unit cancel times : cancel times (see paper for definition) for GO and STOP units at each stop signal delay (SSD)

Signal Respond Comparison : buildup of activity in GO and STOP units on signal respond trials (compared to latency-matched NSS trials) - see paper for details

Signal Inhibit Comparison : building of activity in GO and STOP units on signal inhibit trials (compared to latency-matched NSS trials) - see paper for details

The Matlab files are set up as follows. Variables found within the Matlab code are underlined. Matlab files are denoted <filename.m>. See the paper for further details about the models and the parameters..

<model.m>
This is where you want to start and where you specify the following variables and parameters:
1. the type of model you want to run
   a. modelNo = 0 for the *independent model*
   b. modelNo = 1 for the *interactive model*
2. the number of trials you want to run at each stop signal delay (SSD)
   a. NUMB_TR = number of trials to simulate at each SSD and NSS. This is the minimum number of trials that will be simulated. The simulation runs until the minimum number of RTs are produced (NSS trials or noncanceled trials) or the number of trials equals 2.5 times this minimum at that particular SSD.
3. the parameters of the model you want to run – this is a vector
   a. for independent model, the order is: [meanGO stdGO meanSTOP stdSTOP Dstop]
   b. for interactive model, the order is: [meanGO stdGO meanSTOP stdSTOP inhibGO inhibSTOP Dstop]
4. the stop signal delays you want to use
   a. SSDall is a vector

<HostCMSimulation_Public.m>
This is the main program. It runs each trial and keeps tracks of things. It is run once with many trials (NUMB_TR = 4000 in the paper) to get the behavioral data, and then run many times (500 times in the paper) with a smaller number of trials (NUMB_TR = 20 in the paper) to determine the cancel times of the GO and STOP units. This program has many subprograms:
1. <SetParams_Public.m> sets the parameters to specific variables
2. <OneTrial_Public.m> runs one trial of the simulation
   a. <AccumulateResp_Public.m> produces the GO and STOP unit activation functions over time
3. <CalcSSRT_Public.m> calculates SSRT. Outputs SSRT as calculated using the integration method, the difference method, and the average of the two.
4. <LatMatch_Public.m> determines which no-stop-signal trials are latency matched with the signal-respond and signal-inhibit trials.
5. <getActFunc_Public.m> calculates the mean activation function for the GO and STOP processes as a function of stop signal delay for the no-stop-signal, signal-respond, and signal-inhibit trials.
6. <findCancelTime_Public,m> determines cancellation time for the GO and STOP units.

<PlotCM_Public.m>
Plots the figure that results from running this simulation. Figure contains RT distributions, inhibition function, SSRT, and GO and STOP activation functions at one stop signal delay.