

List of commands

MATLAB

Variables

```
a = 1:5; % create vector (numbers)
b = [1 2 3; 4 5 6]; % create matrix (numbers)
c = 'ciao'; % create vector (chars)
b(2,3) = 10; % assign value to a field in the matrix (or vector)
ResOut(1).stim = 'high'; % structure, assign chars, here just field "1"
ResOut(1).RT = 679 ; % structure, assign number, here just field "1"
z = ones(1,12); % a vector of with 12 "1"
w = [a z]; % a vector with "a" and "z" concatenated
```

Logic: "for" and "if" % display two different strings in the command line

```
for trial = 1:10
    if trial < 6
        disp('small N');
    else
        disp('large N');
    end
end
```

Plotting

```
figure; % open figure
plot(a); % plot vector "a"; see "help plot" for options ...
bar(a); % bar plot of vector "a"
lsline; % draws a least-squares fit line to the plot
close all % closes all figures
```

A few stats commands

```
mean(a); % standard deviation of vector "a"
std(a); % standard deviation of vector "a"
sqrt(2); % square root of a number, here "2"
ttest(X) % t-test, with stats; see "help ttest"
regress(Y,X) % regression, with stats; see "help regress"
```

Other useful commands

```
help xxx % help about command "xxx"; works also for Cogent !
whos % variables in the workspace
clear all % clear all variables in the workspace
rd=randperm(10); % random permutation, here using 1 to 10
ResOut=ResOut(rd); % random permutation of a variable,
                    note: length(ResOut) must be equal length(rd)
save filename a b c % save variable "a b c" in filename.mat
                    note: function MyFun(filename)
                        eval(['save ' filename ' ResOut']);
load filename % load variable filename-file in the workspace
```

COGENT

Initialisation / close

config_display(1,1);	% configure monitor "1", resolution "640x480"
config_keyboard;	% initialize key-presses (keyboard)
start_cogent;	% START cogent
stop_cogent;	% STOP cogent

Show text stimuli

clearpict(1);	% clear buffer "1"
settextstyle('Arial', 50)	% set text style and size
setforecolour(1,0,0);	% set text color, RGB between 0-1
preparestring('Hello', 1, -100, 100);	% prepare string "Hello" offset (-100,100) in buffer "1"
drawpict(1);	% draw buffer "1" to screen

Record responses

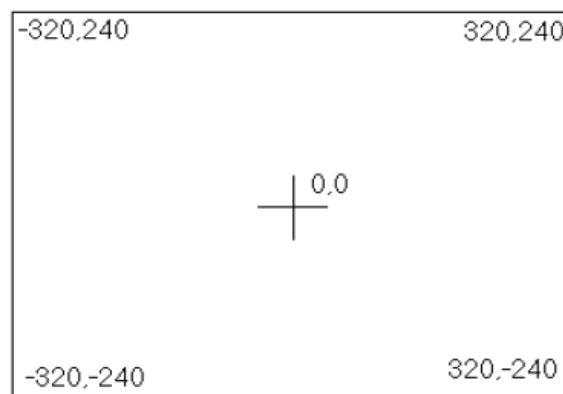
clearkeys;	% clear response buffer
readkeys;	% read data from the response buffer
[Rkey, Rtime, Rnum] = getkeydown;	% return response data, in 3 variables

Other relevant commands

t=time;	% store current cogent-time in "t"
wait(100);	% wait 100 ms

The coordinate system

here for config_display(1,1) 640x480



EXAMPLE

```
function myCogTest (input_name)

config_display(1,1);           % configure monitor "1", resolution "640x480"
config_keyboard;               % initialize key-presses (keyboard)
start_cogent;                  % START cogent

% stimuli
stim(1).str='ciao';
stim(1).red=0.5;
stim(1).posX=100;
stim(2).str='come';
stim(2).red=0.75;
stim(2).posX=0;
stim(3).str='stai?';
stim(3).red=1;
stim(3).posX=-100;

settextstyle('Arial', 50 )

for trial=1:length(stim)
    clearpict(1);               % clear buffer "1"
    setforecolour( stim(trial).red,0,0);
    preparestring( stim(trial).str , 1, 0 , stim(trial).posX);

    clearkeys;                  % clear response buffer

    stim(trial).onset=time;      % get current time
    drawpict(1);                % draw buffer "1" to screen
    wait(2000);                 % text stays on screen dor 2000 ms

    readkeys;                    % read data from the response buffer
    [stim(trial).Rkey, stim(trial).Rtime, stim(trial).Rnum] = getkeydown;

end

stop_cogent;                    % STOP cogent

eval(['save ' input_name ' stim']); % SAVE output

% -----
% online results (RTs)
RTs=[];
for i=1:length(stim)
    RTs=[RTs stim(i).Rtime-stim(i).onset];
end
figure
bar(RTs)

clear all
```

The experiment

HYPOTHESIS

Conjunction of shape & colour requires top-down attention

APPROACH

Search for conjunction-defined vs. pop-out targets

Compare search slopes, as a function of the number of stimuli

PREDICTION

Conjunction-search requires attending to each item, RT will increase with the number of items

PARADIGM

Task: find "red X" - the target !

Conjunction condition: distractors are either "red O" or "green X"

Pop-out condition: distractors are either "green O" or "green X" (red target will pop-out)

Number of stimuli in each display: 4 8 12 16

PROCEDURE

Task: detect "red X" *[or 50% present, 50 % absent]*

Conjunction task, tot = 40 trials (10 for each set)

Pop-out task, tot = 40 trials (10 for each set)

All conditions inter-mixed

Stimulus positions: use a 5x5 grid on the full screen, exclude the central position

Stimulus duration: 3 seconds

Inter-trial interval: 2500 ms *[or variable 2000, 2500, 3000, 3500]*

ANALYSIS

"Null hypothesis": slope conjunction = slope pop-out

Before you start

- 1) Create a new folder: eg. /Desktop/myExpTP
- 2) Start Matlab. Use windows "search file" ..
- 3) cd to the new folder-dir.
- 4) add Cogent path