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\ Based on program written by Charles Pickens 7/12/07
\ Adapted 6/12/13 by Mike McDannald
\ Probabilistic Reinforcement "25" program
\ Contains 4 trial types
\ Cues on for 10 seconds, followed by one second empty and on footshock trials a 0.5s, 0.5mA shock
\ Arduino1 100% reinforced with footshock (4)
\ Arduino2 25% reinforced with footshock (2 trial shock, 6 trials no shock)
\ Arduino3 0% reinforced with footshock (4)
\ Conditioning occurs over a baseline vi60 schedule, unrelated to the schedule of the conditioning trials
\ Session terminates after 16 total trials and trial order is randomly selected without replacement
\ Mean ITI = 180 seconds, varying from 150 seconds to 210 seconds

\ 100% cue - arduino 1
\ PR cue -   arduino 4
\ 0% cue -   arduino 3

\ #R1 - Nosepoke (center)
\ #R2 - Nosepoke (left) Make sure these are inserted in chamber
\ #R3 - Nosepoke (right) Make sure these are inserted in chamber

\ define outputs:

^shock =     1
^feeder =    2
^leftcue =   3
^rightcue =  4
^backhouse = 5
^boxfan =    6
^arduino1 =  9
^arduino2 =  10
^arduino3 =  11
^arduino4 =  12

\ define inputs

^nosepoke1 = 1
^nosepoke2 = 2
^nosepoke3 = 3

\ define variables
\ A(0) = number of nosepokes
\ A(1) = number of rewards
\ A(2) = 100% cue counter
\ A(3) = PR cue shock counter
\ A(4) = PR cue no shock counter
\ A(5) = 0% cue counter
\ A(6) = 100% shock counter
\ A(7) = 50% shock counter
\ A(8) = total trial # counter
\ B =
\ C = vi60 list
\ D = iti list
\ E = trial list
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\ F = nosepoke array
\ G = reward array
\ H = 100% cue array
\ I = PR cue shock array
\ J = PR cue no shock array
\ K = 0% cue array
\ L = iti selected without replacement
\ M = iti in seconds
\ N = session timer
\ O = trial type selected without replacement
\ P = 100% shock array
\ Q = 50% shock array
\ R =
\ S =
\ T = time in 0.01 s intervals
\ U =
\ V =
\ W =
\ X =
\ Y = vi60 interval in seconds
\ Z = vi60 interval selected without replacement

List A = 0, 0, 0, 0, 0, 0, 0, 0, 0
List C = 114, 108, 102, 96, 90, 84, 78, 72, 66, 60, 60, 54, 48, 42, 36, 30, 24, 18, 12, 6 \ vi60 list
List D = 180, 180, 170, 190, 160, 200, 150, 210 \ iti list
List E = 1, 1, 1, 1, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4 \ trial list

DIM F = 49999 \ sets nosepoke array to 50000
DIM G = 499 \ sets reward delivery time array to 500
DIM H = 19 \ 100% cue array
DIM I = 19 \ PR cue shock array
DIM J = 19 \ PR cue no shock array
DIM K = 19 \ 0% cue array
DIM P = 19 \ PR shock array
DIM Q = 19 \ PR shock array

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s.s.1, \ Main control logic for vi60 schedule

s1,
  #start: on ^boxfan ---> s2

s2,
  0.01": randd Z = C; SET Y = Z*1"; SHOW 2, VI, Z/100 ---> s3 \ this sets the VI timer

s3,
  Y#T: show 2, Interval, 0 ---> s4 \ waits until the time is up and then awaits a response

s4,
  #R ^nosepoke1: on ^feeder; Z1 ---> s2
  0.01": show 2, VI, 0 ---> sx
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s.s.2, \ Response counter

s1,
 #start: show 3, # Pokes, A(0) ---> s2

s2,
 #R ^nosepoke1: set F(A(0)) = T; add A(0); set F(A(0)) = -987.987; show 3, # Pokes, A(0) ---> sx
 #z2: ---> s1

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s.s.3, \ Reward counter

s1,
 #z1: SET G(A(1)) = T; ADD A(1); SET G(A(1)) = -987.987; show 4, # Rewards, A(1) ---> s2

s2,
 0.05": off ^feeder ---> s1

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s.s.4, \ Time incriment in 0.01 second intervals

s1,
 #start: ---> s2

s2,
 0.01": SET T = T + 0.01 ---> sx

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s.s.5 \ Session Timer

s1,
 #start: show 1, Session, N ---> s2

s2,
 1": Add N; show 1, Session, N/100 ---> sx

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s.s.6, \ Main control logic for trials

s1,
 #start: ---> s2

s2,
 4': ---> s3 \ 5 minute warmup period

s3,
 0.01": randd L = D; SET M = L*1"; SHOW 5, ITI, L/100 ---> s4 \ this sets the ITI timer
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s4,
 M#T: randd O = E; if O = 1 [@true, @false] \ checks for 100% trial
                    @true: ---> s5
                    @false: if O = 2 [@true, @false] \ checks for PR shock trial
                                @true: ---> s11
                                @false: if O = 3 [@true, @false] \ checks for PR omission trial
                                            @true: ---> s17
                                            @false: if O = 4 [@true, @false] \ checks for 0% trial
                                                        @true: ---> s23
                                                        @false: ---> sx
s5,

 1.00": ADD A(8)  ---> s6

s6,

 0.01": SET H(A(2)) = T; ADD A(2); SET H(A(2)) = -987.987; on ^arduino1 ---> s7

s7,
 1.00": off ^arduino1 ---> s8

s8,
 10.00": SET P(A(6)) = T; ADD A(6); SET P(A(6)) = -987.987; on ^shock ---> s9

s9,
 0.50":  off ^shock ---> s10

s10,
 0.01": if A(8) > 15 [@true, @false]
                    @true: ---> s30
                    @false: ---> s3

s11,

 1.00": ADD A(8) ---> s12

s12,

 0.01": SET I(A(3)) = T; ADD A(3); SET I(A(3)) = -987.987; on ^arduino4 ---> s13

s13,
 1.00": off ^arduino4 ---> s14

s14,
 10.00": SET Q(A(7)) = T; ADD A(7); SET Q(A(7)) = -987.987; on ^shock ---> s15

s15,
 0.50":  off ^shock ---> s16

s16,
 0.01": if A(8) > 15 [@true, @false]
                    @true: ---> s30
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                    @false: ---> s3

s17,

 1.00": ADD A(8) ---> s18

s18,

 0.01": SET J(A(4)) = T; ADD A(4); SET J(A(4)) = -987.987; on ^arduino4 ---> s19

s19,
 1.00": off ^arduino4 ---> s20

s20,
 10.00": ---> s21

s21,
 0.50":  ---> s22

s22,
 0.01": if A(8) > 15 [@true, @false]
                    @true: ---> s30
                    @false: ---> s3

s23,

 1.00": ADD A(8); ---> s24

s24,

 0.01": SET K(A(5)) = T; ADD A(5); SET K(A(5)) = -987.987; on ^arduino3 ---> s25

s25,
 1.00": off ^arduino3 ---> s26

s26,
 10.00": ---> s27

s27,
 0.50":  ---> s28

s28,
 0.01": if A(8) > 15 [@true, @false]
                    @true: ---> s30
                    @false: ---> s3

s30,
 1': ---> STOPABORTFLUSH
```