

```

1  -----
2  --
3  --
4  --
5  --
6  --
7  --
8  --
9  -----
10 local help={
11
12 bore == best or rest
13 (c) 2022, Tim Menzies, BSD 2-clause license.
14
15 USAGE:
16   lua bore.lua [OPTIONS]
17
18 OPTIONS:
19   -Dump          stack dump on error = false
20   -Format S      format string          = %5.2f
21   -best F        best space              = .15
22   -cohen F       Cohen's delta           = .35
23   -data N        data file               = etc/data/auto93.csv
24   -furthest F    far                    = .9
25   -help          show help               = false
26   -seed I        random seed             = 10019
27   -todo S        start-up action         = nothing
28
29 }
30 -----
31 --
32 --
33 --
34 --
35 --
36 --
37 local b4={}; for k,_ in pairs(_ENV) do b4[k]=k end
38 local big  = 1E32
39 local tiny = 1E-32
40 local the  = {}
41
42 local fails=0
43 local function asserts(test, msg)
44   print(test and "PASS: " or "FAIL: ",msg or "")
45   if not test then
46     fails=fails+1
47     if the.Dump then assert(test,msg) end end end
48
49 local function atom(x)
50   if type(x)~="string" then return x end
51   x = x:match("^%s*(-)%s*$")
52   if x=="true" then return true elseif x=="false" then return false end
53   return tonumber(x) or x end
54
55 local function atoms(x, t)
56   t={}; for y in x:gmatch(sep or "([^\s]+)") do t[1+#t]=atom(y) end; return t end
57
58 local function cli(key,x)
59   for n,y in pairs(arg) do if y==k then
60     x=x=="false" and"true" or x=="true" and"false" or arg[n+1] end end
61   return atom(x) end
62
63 local fmt = string.format
64
65 local function map(t,f, u)
66   u={};for k,v in pairs(t) do u[1+#u]=f(v) end; return u end
67
68 local function o(t)
69   if type(t)~="table" then return tostring(t) end
70   local key=function(k) return fmt("%s %s",k,o(t[k])) end
71   local u = #t>0 and map(t,o) or map(slots(t),key)
72   return '{ ' ..table.concat(u, " " ) .."}' end
73
74 local function oo(t) print(o(t)) end
75
76 local function rows(file, x,prep)
77   file = io.input(file)
78   return function()
79     x=io.read(); if x then return atoms(x) else io.close(file) end end end
80
81 local function sort(t,f) table.sort(t,f); return t end
82
83 local function slots(t, u)
84   u={}; for k,v in pairs(t) do if k:sub(1,1)~="_" then u[1+#u]=k end end;
85   return sort(u) end

```

```

86  -----
87  --
88  --
89  --
90  --
91  --
92  --
93  --
94  --
95  --
96  --
97  --
98  --
99  --
100 --
101 --
102 --
103 --
104 --
105 --
106 --
107 --
108 --
109 --
110 --
111 --
112 --
113 --
114 --
115 --
116 --
117 --
118 --
119 --
120 --
121 --
122 --
123 --
124 --
125 --
126 --
127 --
128 --
129 --
130 --
131 --
132 --
133 --
134 --
135 --
136 --
137 --
138 --
139 --
140 --
141 --
142 --
143 --
144 --
145 --
146 --
147 --
148 --
149 --
150 --
151 --
152 --
153 --
154 --
155 --
156 --
157 --
158 --
159 --
160 --
161 --
162 --
163 --
164 --
165 --
166 --
167 --
168 --
169 --
170 --
171 --
172 --
173 --
174 --
175 --
176 --
177 --
178 --
179 --
180 --
181 --
182 --
183 --
184 --
185 --
186 --
187 --
188 --
189 --
190 --
191 --
192 --
193 --

```

# bore

```

local as=setmetatable
local function obj( t)
  t={__tostring=o}; t.__index=t
  return as(t, {__call=function(_,...) return t.new(...) end}) end

-- COL
local function col(at,x, i)
  i = {n=0, at=at or 0, txt=txt or "", has={}}
  i.w = i.txt:find"$" and -1 or 1
  return i end

local function add(self,x,inc)
  if x~="?" then
    inc = inc or 1
    self.n = self.n+1
    self:add1(x,inc or inc) end
  return self end

-- NUM
local Num=obj{}
function Num:new(at,x, new)
  new = as(col(at,t),self)
  new.mu, new.m2, new.lo, new.hi= 0,0,-big,big
  return new end

function Num:add1(self,x,_, d)
  d = x - self.mu
  self.mu = self.mu + d/self.n
  self.m2 = self.m2 + d*(x - self.mu)
  self.sd = (self.n<2 or self.m2<0) and 0 or (self.m2/(self.n-1))^.5
  if x > self.max then self.max = x end
  if x < self.min then self.min = x end end

function Num:norm(x)
  return self.hi-self.lo<tiny and 0 or (x-self.lo)/(self.hi-self.lo) end

function Num:heaven(x, heaven)
  return ((self.w>0 and 1 or 0) - self:norm(x))^the.p end

-- SYM
local Sym=obj{}
function Sym:new(at,x,inc, new)
  new=as(col(at,x),self); new.most=0; return new end

function Sym:add1(x,inc)
  i.has[x] = inc + (i.has[x] or 0)
  if i.has[x] > i.most then i.most,i.mode=i.has[x],x end end

-- COLS
local Cols=obj{}
function Cols:new(headers, new,col,here)
  new = as({all={}, x={}, y={},},self)
  for at,x in pair(headers) do
    if x:find"$" then new.all[at] = Skip(at,x) else
      col = (x:find"^[A-Z]" and Num or Sym) (at,x)
      self.all[at] = col
      here = x:find"[+-]$" and self.y or self.x
      here[1+#here] = new end end
  return new end

function Cols:add(t)
  for _,col in pairs(self.all) do col:add(t[col.at]) end
  return t end

function Cols:clone(rows, new)
  new = new or Cols(map(self.cols.all, function(x) return x.txt end))
  for _,row in pairs(rows or {}) do new:add(row) end
  return {rows=rows,cols=new} end

-- DATA
local Data=obj{}
function Data:new(inits, new)
  new = as({rows={},heavens=Num()},self)
  if type(inits)=="string" then for row in csv(inits) do new:add(row) end end
  if type(inits)=="table" then for _,row in pairs(inits) do new:add(row) end end
  return new end

function Data:add(t, n)
  if self.cols then self:addData(t) else
    self.cols = Cols(t)
    self.best = self.cols:clone()
    self.rest = self.cols:clone() end end

function Data:addData(t, n)
  self.rows[1+#self.rows] = self.cols:add(t)
  n = self.heavens.norm( self.heavens.add(self.heaven(t)))
  (n>the.best and self.best or self.rest):add(t) end

function Data:heaven(t)
  heaven = function(col) return col:heaven(t[col.at]) end
  return (sum(self.cols.y,heaven)/#self.cols.y)^(1/the.p) end

```

```

194 -- -----
195 --
196 --
197 --
198 --
199 --
200 --
201 local Demos={}
202 function Demos.the() oo(the) end
203
204 help:gsub("\n [-]([^\s]+)[^\n]*%s([^\s]+)",function(key,x)
205     for n,flag in ipairs(arg) do
206         if flag:sub(1,1)=="-" and key:find("^"..flag:sub(2)..".") then
207             x = x=="false" and true or x=="true" and "false" or arg[n+1] end end
208         the[key] = atom(x) end)
209
210 if the.help then print(help) else
211     for _,todo in pairs(the.todo=="all" and slots(Demos) or {the.todo}) do
212         math.randomseed(the.seed)
213         if type(Demos[todo])=="function" then Demos[todo]() end end end
214
215 os.exit(fails)

```