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{
12/14/2014 Ether
read 8-column whitespace-delimited match data file
and create matrices for overdetermined linear system
}

{$APPTYPE CONSOLE}

USES Windows, Sysutils;

VAR
r1,r2,r3,b1,b2,b3,rs,bs: word;
aTeamID: array[1..8000]of word;
aTeamNum: array[1..4000]of word;
f,fAt,fb: text;

CONST
CR=#13#10;
ID: word=0;
eq: word=0;
t0: int64=0;
t1: int64=0;
secPerCyc: double=1.0/3391.6e6;

function RDTSC64 : int64 ;
// This is minimally invasive and accurate down to about 40 cycles
asm  DB 0FH ; DB 031H  end ;

procedure f1(TeamNum: word);
begin
if aTeamID[TeamNum]=0 then
 begin
 inc(ID); aTeamID[TeamNum]:=ID; aTeamNum[ID]:=TeamNum;
 end;
end;

procedure f2(t1,t2,t3: word);
var
id1,id2,id3,z: word;
begin
id1:=aTeamID[t1]; id2:=aTeamID[t2]; id3:=aTeamID[t3];
// sort the ID's, because Octave wants the sparse matrix elements sorted:
if (id1>id2) then begin z:=id1; id1:=id2; id2:=z end;
if (id1>id3) then begin z:=id1; id1:=id3; id3:=z end;
if (id2>id3) then begin z:=id2; id2:=id3; id3:=z end;
// id123 are now in ascending order
// You want to output the *transpose* of the A matrix...
// so you will output id as *row* and eq as *col*:
inc(eq);
// un-comment the line below to write the sparse design matrix to disk file:
// writeln(fAt,id1,' ',eq,' 1',cr,id2,' ',eq,' 1',cr,id3,' ',eq,' 1');
end;
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```
procedure main;

begin

assign(f,'HillData.dat');
reset(f);

assign(fAt,'$At.dat');
rewrite(fAt);

assign(fb,'$b.dat');
rewrite(fb);

fillchar(aTeamID,sizeof(aTeamID),0);
fillchar(aTeamNum,sizeof(aTeamNum),0);

t0:=RDTSC64;
while not eof(f) do
 begin
 readln(f,r1,r2,r3,b1,b2,b3,rs,bs);
 // assign TeamID's:
 f1(r1); f1(r2); f1(r3); f1(b1); f1(b2); f1(b3);
 // populate the transposed design matrix At:
 f2(r1,r2,r3);
 f2(b1,b2,b3);
 // un-comment the line below to write the alliance scores vectors:
 // writeln(fb, rs,' ',rs-bs,cr,bs,' ',bs-rs);
 end;
t1:=RDTSC64;

writeln('t1-t0=',secPerCyc*(t1-t0):0:4);
close(f);
close(fAt);
close(fb);
end; // main

BEGIN

try
main;
except
on E : Exception do
  begin
  write(cr,
  'program did not complete successfully...',cr,
  '***',E.Message,'***',cr
  );
  readln;
  end;
end{main except}

END.
```