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algol<
begin
   comment

   https://projecteuler.net/problem=61

   Answer:  28684
   Time:    8030.38s = 2h 13m 50.38s
   Time:        Classic:        7893.65s
   Time:        Turbo:          6974.42s

   No buffer, no index check:

   Time classic:        7938.42
   Time turbo:          7036.65 11.4pct

   Buffer, no index check:

   Time classic:        6655.42
   Time turbo:          6091.44 8.5pct

   No buffer, index check:

   Time classic:        7893.65
   Time turbo:          7045.71 10.7pct

   Buffer, index check:

   Time classic:        8032.21
   Time turbo:          7153.58 10.9pct

   PERM code taken from APL/360 ADVANCEDEX PERM function.

   ;
   real clock;
   real procedure clock count;
   code clock count;
   1, 37;
     zl        , grf p-1   ; RF:=clock count; stack[p-1]:=RF;
   e;
   integer procedure triangle(n);
   value n;
   integer n;
   begin
      integer n2;
      n2:=-0.5+sqrt(0.25+2×n);
      triangle:=if (n2×(n2+1):2)=n then n2 else 0
   end;
   integer procedure square(n);
   value n;
   integer n;
   begin
      integer n2;
      n2:=sqrt(n);
      square := if n2×n2=n then n2 else 0
   end square;
   integer procedure pentagonal(n);
   value n;
   integer n;
   begin
      integer n2;
      n2:=(0.5+sqrt(0.25+6×n))/3;
      pentagonal:=if (n2×(3×n2-1):2)=n then n2 else 0
   end;
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integer procedure hexagonal(n);
value n;
integer n;
begin
   integer n2;
   n2 := (1+sqrt(1+8×n))/4;
   hexagonal := if n2×(2×n2-1)=n then n2 else 0
end hexagonal;
integer procedure heptagonal(n);
value n;
integer n;
begin
   integer n2;
   n2 := (1.5+sqrt(2.25+10×n))/5;
   heptagonal := if n2×(5×n2-3):2=n then n2 else 0
end heptagonal;
integer procedure octagonal(n);
value n;
integer n;
begin
   integer n2;
   n2 := (2+sqrt(4+12×n))/6;
   octagonal := if n2×(3×n2-2)=n then n2 else 0
end octagonal;
procedure PERM(Z,a,b);
value a,b;
integer a,b;
integer array Z;
begin
   integer i,j,rem;
   rem:=b-1;
   for i:=1 step 1 until a do
   begin
      Z[a-i+1]:=1+rem mod i;
      rem:=rem:i
   end;
   for i:=a-1 step -1 until 1 do
   for j:=i+1 step 1 until a do
   if Z[i]≤Z[j] then Z[j]:=Z[j]+1
end PERM;
integer array list,Z[1:6];
integer i,j;
integer aa,bb,cc,dd,ee,ff,
   aabb,bbcc,ccdd,ddee,eeff,ffaa;
clock count;
for aa:=10 step 1 until 99 do
begin
for bb:=10 step 1 until 99 do
begin
if aa=bb then goto notbb;
list[1]:=aabb:=aa×100+bb;
if octagonal(aabb)=0 then goto notbb;
for cc:=10 step 1 until 99 do
begin
if aa=cc then goto notcc;
if bb=cc then goto notcc;
list[2]:=bbcc:=bb×100+cc;
if heptagonal(bbcc)=0 ∧
      hexagonal(bbcc)=0 ∧
      pentagonal(bbcc)=0 ∧
      square(bbcc)=0 ∧
      triangle(bbcc)=0 then goto notcc;
for dd:=10 step 1 until 99 do
begin
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      if aa=dd then goto notdd;
      if bb=dd then goto notdd;
      if cc=dd then goto notdd;
      list[3]:=ccdd:=cc×100+dd;
   if heptagonal(ccdd)=0 ∧
         hexagonal(ccdd)=0 ∧
         pentagonal(ccdd)=0 ∧
         square(ccdd)=0 ∧
         triangle(ccdd)=0 then goto notdd;
   for ee:=10 step 1 until 99 do
   begin
      if aa=ee then goto notee;
      if bb=ee then goto notee;
      if cc=ee then goto notee;
      if dd=ee then goto notee;
      list[4]:=ddee:=dd×100+ee;
   if heptagonal(ddee)=0 ∧
         hexagonal(ddee)=0 ∧
         pentagonal(ddee)=0 ∧
         square(ddee)=0 ∧
         triangle(ddee)=0 then goto notee;
   for ff:=10 step 1 until 99 do
   begin
      if aa=ff then goto notff;
      if bb=ff then goto notff;
      if cc=ff then goto notff;
      if dd=ff then goto notff;
      if ee=ff then goto notff;
      list[5]:=eeff:=ee×100+ff;
   if heptagonal(eeff)=0 ∧
         hexagonal(eeff)=0 ∧
         pentagonal(eeff)=0 ∧
         square(eeff)=0 ∧
         triangle(eeff)=0 then goto notff;
      list[6]:=ffaa:=ff×100+aa;
   if heptagonal(ffaa)=0 ∧
         hexagonal(ffaa)=0 ∧
         pentagonal(ffaa)=0 ∧
         square(ffaa)=0 ∧
         triangle(ffaa)=0 then goto notff;
         for i:=1 step 1 until 720 do
         begin
   PERM(Z,6,i);
         if triangle(list[Z[1]])=0 then goto notperm;
         if square(list[Z[2]])=0 then goto notperm;
         if pentagonal(list[Z[3]])=0 then goto notperm;
         if hexagonal(list[Z[4]])=0 then goto notperm;
         if heptagonal(list[Z[5]])=0 then goto notperm;
         if octagonal(list[Z[6]])=0 then goto notperm;
         writecr;
         write(⦃dddddd⦄,aabb,bbcc,ccdd,ddee,eeff,ffaa,
                           aabb+bbcc+ccdd+ddee+eeff+ffaa);
notperm: end for i;
notff: end ff;
notee: end ee;
notdd: end dd;
notcc: end cc;
notbb: end bb;
 end aa;
   clock:=clock count;
   writecr;
   write(⦃ddddddd.dd⦄,clock)
end;
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