program CoroutinesTowersHanoi;
(* towers of hanoi with coroutines *)
(* there are three towers built of decreasing rings stringed onto sticks *)
(* at the initial state all rings are stringed onto stick no. 1. our job is *)
(* to move all rings from the stick 1 to the stick 3. the difficulty is *)
(* that we mustn't violate the following conditions *)
(* 1. we can move only one ring at one step *)
(* 2. each ring may be placed only onto a greater one *)
(* to manage with this difficult problem we have an auxilliary stick 2 *)

unit WZ:coroutine(N,F,T:integer);
(* move n rings from stick f to stick t *)
var K:integer;
begin
return;
  do
    K:=6-(F+T);
    if N>1 then attach (P(N-1,F,K)); fi;
    call MODYF(F,T); (* MOVE ONLY ONE RING *)
    if N>1 then attach (P(N-1,K,T)); fi;
    detach;
  od;
end WZ;

unit MODYF:procedure(F,T:INTEGER);
(* move the topmost ring from stick f to stick t *)
begin
  TOP(T):=TOP(T)+1;
  W(T,TOP(T)):=W(F,TOP(F));
  W(F,TOP(F)):=0;
  TOP(F):=TOP(F)-1;
  call DISPL;
end MODYF;

unit DISPL:procedure;
(* PRINTING *)
var T,I,J,K,M,N:INTEGER;
begin
  T:=1;
  for I:=2 to 3 do
    if TOP(I)>TOP(T) then T:=I fi;
  od;
  T:=TOP(T);
  for I:=T downto 1 do
    M:=15;
    for J:=1 to 3 do
      for K:=1 to M do WRITE(" "); od;
      if W(J,I)=/=0 then
        for K:=1 to W(J,I) do WRITE("*"); od;
        fi;
      M:=15-W(J,I);
      od;
    WRITELN;
  od;
  for I:=1 to 15 do WRITE(" "); od;
  for I:=1 to 45 do WRITE("-"); od;
  WRITELN;
end DISPL;
var  \texttt{W:arrayof arrayof INTEGER},  \quad (* \text{how many rings are stringed} *)
\quad (* \text{on each stick} *)
\texttt{TOP:arrayof INTEGER},  \quad (* \text{the topmost ring size on each stick} *)
\texttt{NB,I,J,K,TIMEB:INTEGER},
\texttt{P:arrayof arrayof arrayof WZ};  \quad (* \text{coroutine pointers} *)

begin
\texttt{array W dim(1:3);}
\texttt{array TOP dim(1:3);}
\texttt{WRITELN(" PROGRAM TOWERS OF HANOI");}
\texttt{WRITELN(" VERSION WITH COROUTINES");}
do  \texttt{WRITELN(" GIVE THE NUMBER OF RINGS");}
\texttt{READ(NB);}
\texttt{WRITELN(NB);}
\texttt{if NB>0 then exit}
else
\texttt{WRITELN(" NUMBER OF RINGS MUST BE GREATER THAN 0")}
fi
\texttt{od;}
\texttt{TIMEB:=TIME;}
\texttt{TOP(1):=NB;}
\texttt{array W(1) dim(1:NB);}
\texttt{array W(2) dim(1:NB);}
\texttt{array W(3) dim(1:NB);}
\texttt{K:=NB;}
\texttt{for I:=1 to NB do}
\texttt{\quad W(1,I):=K;}
\texttt{\quad K:=K-1;}
\texttt{od;}
\texttt{(* STICK 1 IS FULL *)}
\texttt{WRITELN(" THE ALGORITHM ACTS AS FOLLOWS");}
\texttt{call DISPL;}
\texttt{array P dim (1:NB);}
\texttt{for I:=1 to NB}
\texttt{\quad array P(I) dim(1:3);}
\texttt{\quad for J:=1 to 3}
\texttt{\quad\quad array P(I,J) dim(1:3);}
\texttt{\quad\quad for K:=1 to 3}
\texttt{\quad\quad\quad if J=/=K then P(I,J,K):=new WZ(I,J,K) fi}
\texttt{\quad\quad od}
\texttt{\quad od}
\texttt{od;}
\texttt{attach (P(NB,1,3));}
end