

**Exercise Answers**

1. Nested triangles

```

TO TRI :SIZE :LEVEL
  IF :LEVEL = 0 THEN REPEAT 3 [FD :SIZE RT 120]
  STOP
  TRI (:SIZE / 2) (:LEVEL - 1)
  FD (:SIZE / 2)
  TRI (:SIZE / 2) (:LEVEL - 1)
  RT 60
  TRI (:SIZE / 2) (:LEVEL - 1)
  FD (:SIZE / 2)
  RT 60
  TRI (:SIZE / 2) (:LEVEL - 1)
  LT 60
  BK (:SIZE / 2)
  LT 60
  BK (:SIZE / 2)
END

```

2. Square snowflake

```

TO SNOW 1:SIZE :LEVEL
  REPEAT 4 [SIDE1 :SIZE :LEVEL RT 90]
END
TO SIDE1 :SIZE :LEVEL
  IF :LEVEL = 0 THEN FD :SIZE STOP
  SIDE1 (:SIZE / 3) (:LEVEL - 1)
  LT 90
  SIDE1 (:SIZE / 3) (:LEVEL - 1)
  RT 90
  SIDE1 (:SIZE / 3) (:LEVEL - 1)
  RT 90
  SIDE1 (:SIZE / 3) (:LEVEL - 1)
  LT 90
  SIDE1 (:SIZE / 3) (:LEVEL - 1)
END

```

3. Curve with no gradient at any point

```

TO W :XSTEP :YSTEP :LEVEL
  WUP :XSTEP :YSTEP :LEVEL
  WDOWN :XSTEP :YSTEP :LEVEL
END
TO WUP :XSTEP :YSTEP :LEVEL
  IF :LEVEL = 0 THEN SETXY (XCOR + :XSTEP)
  (YCOR + :YSTEP) STOP
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
END
TO WDOWN :XSTEP :YSTEP :LEVEL
  IF :LEVEL = 0 THEN SETXY (XCOR + :XSTEP)
  (YCOR - :YSTEP) STOP
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WUP (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
  WDOWN (:XSTEP / 6) (:YSTEP / 2) (:LEVEL - 1)
END

```

Space Turtle Program

```

TO START
  MAKE "MAX 0
  MAKE "BEST "
  DRAW
  HT
  TARGET
  PLAY
END

TO TARGET
  PU SETXY 0 5 PD
  RT 90
  REPEAT 36 [FD 31.4/36 RT 10]
  PU
END

TO PLAY
  GET.NAME
  INIT
  DRIVE
END

TO GET.NAME
  SPLITSCREEN
  PRINT1 [WHAT IS YOUR NAME?]
  MAKE "NAME FIRST REQUEST
END

TO INIT
  MAKE "SCORE 200
  SETXY 100 100
  SETH 270
  MAKE "XVEL 0
  MAKE "YVEL 0
  FULLSCREEN
  ST
END

TO DRIVE
  COMMAND
  DYNA.MOVE
  IF DISTANCE < 5 THEN DONE STOP
  MAKE "SCORE :SCORE - 1
  IF :SCORE = 0 THEN OUT.OF.TIME
  STOP
  DRIVE
END

TO COMMAND
  MAKE "COM READKEY
  IF :COM = "R THEN RIGHT 30
  IF :COM = "L THEN LEFT 30
  IF :COM = "K THEN KICK
END

TO READKEY
  IF RC? THEN OUTPUT
  READCHARACTER
END

OUTPUT "
END

TO KICK
  MAKE "XVEL + 3 * SIN HEADING
  MAKE "YVEL + 3 * COS HEADING
END

TO DYNA.MOVE
  SETXY XCOR + :XVEL
  YCOR + :YVEL
END

TO DISTANCE
  OUTPUT SORT
  (XCOR * XCOR + YCOR * YCOR)
END

TO DONE
  PRINT "
  SPLITSCREEN
  (PRINT [WELL DONE] :NAME)
  (PRINT [YOUR SCORE WAS]
  :SCORE)
  REPORT
  AGAIN
END

TO REPORT
  IF :SCORE > :MAX THEN MAKE
  "MAX :SCORE MAKE "BEST :NAME
  PRINT "
  (PRINT [HIGH SCORER IS] :BEST
  [WITH] :MAX [POINTS])
END

TO AGAIN
  PRINT1 [ANOTHER GO?]
  MAKE "ANS FIRST REQUEST
  IF :ANS = "YES THEN REPLAY
  STOP
  IF :ANS = "NO THEN STOP
  PRINT [MAKE YOUR MIND UP, YES
  OR NO?]
  AGAIN
END

TO OUT.OF.TIME
  PRINT "
  SPLITSCREEN
  PRINT [YOUR TIME HAS RUN OUT]
  AGAIN
END

TO REPLAY
  HT
  GET.NAME
  INIT
  DRIVE
  END

```