



Exercise Answers

1) Tangram Puzzles

The man sitting, the man bowing, and the cat shapes, all use the other side of the parallelogram piece from that used by the dog in last week's example. In order to turn a piece over in LOGO, you simply change all RIGHT turns to LEFT turns. So instead of:

```
TO PAR
  REPEAT 2 [FD 25 RT 45 FD 35 RT 135]
END
```

we will sometimes need its 'other side' given by:

```
TO PAR1
  REPEAT 2 [FD 25 LT 45 FD 35 LT 135]
END
```

All the other piece procedures are exactly as given in the last part of this course

Man Running

```
TO RUNNING
  MOVE1 TRI1 MOVE2 PAR MOVE3 TRI3 MOVE4
  TRI3 MOVE5 SQUARE MOVE6 TRI1 MOVE7 TRI2
  MOVE8
END
TO MOVE1
  LT 45
END
TO MOVE2
  PU FD 25 RT 135 FD 17.5 LT 45 PD
END
TO MOVE3
  PU FD 75 RT 90 PD
END
TO MOVE4
  PU RT 90 FD 25 RT 90 PD
END
TO MOVE5
  PU FD 50 RT 135 FD 50 LT 135 PD
END
TO MOVE6
  PU RT 135 FD 21 RT 135 FD 25 LT 90 FD 50
  LT 90 FD 25 RT 90 PD
END
TO MOVE7
  PU FD 25 RT 135 FD 71 RT 45 BK 35 PD
END
TO MOVE8
  PU FD 35 LT 90 FD 25 RT 45 FD 17.5 LT 45
  FD 25 RT 135 PD
END
```

Man Sitting

```
TO SITTING
  MOVE1 TRI1 MOVE2 TRI2 MOVE3 TRI3 MOVE4
  TRI1 PAR1 MOVE5 SQUARE MOVE6 TRI3 MOVE7
END
TO MOVE1
  LT45
END
TO MOVE2
  PU FD 25 LT 45 FD 17.5 RT 90 PD
END
TO MOVE3
  PU BK 15 LT 90 PD
END
TO MOVE4
  PU FD 50 RT 45 FD 25 RT 90 PD
END
TO MOVE5
  PU FD 25 LT 45 FD 35 LT 45 PD
END
TO MOVE 6
  PU BK 50 LT 90 PD
END
TO MOVE7
  PU BK 21 RT 135 BK 50 RT 90 FD 35 LT 90
  PD
END
```

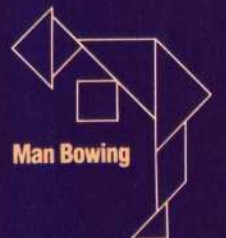
Man Bowing

```
TO BOWING
  MOVE1 TRI1 MOVE2 PAR1 MOVE3 TRI3 MOVE4
  TRI3 MOVE5 TRI1 MOVE6 TRI2 MOVE7 SQUARE
  MOVE8
END
TO MOVE1
  LT 90
END
TO MOVE2
  PU FD 25 RT 135 FD 30 PD
END
TO MOVE3
  PU LT 45 FD 35 LT 135 BK 50 PD
END
TO MOVE4
  PU RT 90 FD 50 LT 135 PD
END
TO MOVE5
  PU RT 90 FD 50 LT 135 FD 5 RT 90 PD
END
TO MOVE6
  PU RT 90 FD 25 RT 45 FD 7.5 RT 45 BK 35
  PD
END
TO MOVE7
  PU FD 35 RT 135 FD 7.5 LT 45 FD 55 RT 45
  PD
END
TO MOVE8
  PU LT 45 FD 36 RT 45 FD 56 LT 135 FD 5
  LT 45 BK 25 PD
END
Cat
TO CAT
  MOVE1 TRI3 MOVE2 SQUARE MOVE3 TRI1 MOVE4
  TRI1 MOVE5 TRI3 MOVE6 PAR1 MOVE7 TRI2
  MOVE8
END
TO MOVE1
  PU FD 50 RT 90 PD
END
TO MOVE2
  RT 170
END
TO MOVE3
  PU RT 90 FD 25 LT 90 PD
END
TO MOVE4
  RT 180
END
TO MOVE5
  PU RT 90 FD 25 LT 80 FD 50 RT 45 FD 50
  RT 90 PD
END
TO MOVE6
  LT 155
END
TO MOVE7
  PU LT 160 FD 35 PD
END
TO MOVE8
  PU FD 35 LT 45 FD 21 RT 135 PD
END
```

Man Running



Man Sitting



Man Bowing



Cat

These are our suggested answers to the Procedure Problems on page 565:

2)

```
TO HOUSE
  SQUARE FD 50 RT 30
  TRI LT 90 BK 50
END
TO SQUARE
  REPEAT 4 [FD 50 RT
  90]
END
TO TRI
  REPEAT 3 [FD 50 RT
  120]
END
```

3)

```
TO BOARD
  REPEAT 5 [LINE FD
  10] BK 50
END
TO LINE
  REPEAT 5 [SQUARE RT
  90 FD 10 LT 90] LT
  90 FD 50 RT 90
END
TO SQUARE
  REPEAT 4 [FD 10
  RT 90]
END
```

4)

```
TO SIX.STAR
  TRI MOVE TRI MOVE.
  BACK
END
TO TRI
  RT 30 REPEAT 3
  [FD 50 RT 120]
END
TO MOVE
  PU FD 29 RT 60 PD
END
TO MOVE.BACK
  PU LT 60 BK 29 PD
END
```