ACTIVITY 7: ROCK 'N' ROLL ROBOT

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPIN AROUND CLOCKWISE this many times: 1
STEP1
MOVE DISTANCE FORWARD for this many feet: 1
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 1
STEP2
MOVE DISTANCE BACKWARD for this many feet: 3
MOVE DISTANCE FORWARD for this many feet: 3
SPIN AROUND COUNTERCLOCKWISE this many times: 1.5
STEP3
MOVE DISTANCE BACKWARD for this many feet: 3
JUMP to the line called "S
Q
```

STEP1

```
SPIN AROUND COUNTERCLOCKWISE this many times: 1.5
MOVE DISTANCE BACKWARD for this many feet: 3
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for thsi many feet: 2
SPIN COUNTERCLOCKWISE this many degrees: 180
MOVE DISTANCE FORWARD for this many feet: 4
SPIN CLOCKWISE this many degrees: 180
MOVE DISTANCE FORWARD for this many feet: 2
Q
```

STEP2

```
TURN ON THE FLASHING LIGHTS
SPIN CLOCKWISE this many degrees: 10
SPIN COUNTERCLOCKWISE this many degrees: 20
SPIN CLOCKWISE this many degrees: 20
SPIN COUNTERCLOCKWISE this many degrees: 20
SPIN CLOCKWISE this many degrees: 20
SPIN COUNTERCLOCKWISE this many degrees: 20
SPIN CLOCKWISE this many degrees: 10
```

```
TURN OFF THE FLASHING LIGHTS
Q
```

STEP3

```
MOVE TIMED BACKWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 20
MOVE TIMED BACKWARD this many seconds: .2
SPIN COUNTERCLOCKWISE this many degrees: 40
MOVE TIMED BACKWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 40
MOVE TIMED BACKWARD this many seconds: .2.
SPIN COUNTERCLOCKWISE this many degrees: 20
Q
```

ACTIVITY 8: THE ROBOT WALTZ

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
WALTZ1
WALTZ1
SPIN AROUND CLOCKWISE this many times: 2
WALTZ1
SPIN COUNTERCLOCKWISE this many degrees: 90
WALTZ1
SPIN COUNTERCLOCKWISE this many degrees: 90
WALTZ1
SPIN COUNTERCLOCKWISE this many degrees: 90
WALTZ1
SPIN COUNTERCLOCKWISE this many degrees: 90
WALTZ1
WALTZ1
SPIN CLOCKWISE this many degrees: 180
WALTZ1
WALTZ1
SPIN CLOCKWISE this many degrees: 180
JUMP to the line called "S
Q
```

WALTZ1

```
SPIN CLOCKWISE this many degrees: 45
MOVE DISTANCE FORWARD for this many feet: 2
WAIT for this many seconds: .3
MOVE DISTANCE BACKWARD for this many feet: 1
WAIT for this many seconds: .1
MOVE DISTANCE BACKWARD for this many feet: 1
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 2
WAIT for this many seconds: .3
MOVE DISTANCE BACKWARD for this many feet: 1
WAIT for this many seconds: .1
MOVE DISTANCE BACKWARD for this many feet: 1
SPIN CLOCKWISE this many degrees: 45
Q
```

ACTIVITY 9: SQUARE DANCE PARTNER

Let's Experiment

The patterns in this program are: 1) Honor your partner, 2) Do-si-do, 3) Alamande, 4) Honor your corner, and 5) Promendade, in that order.

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE DISTANCE FORWARD for this many feet: 2
WAIT for this many seconds: .5
MOVE DISTANCE BACKWARD for this many feet: 2
WAIT for this many seconds: .5
MOVE DISTANCE FORWARD for this many feet: 3
SPIN AROUND CLOCKWISE this many times: 1
MOVE DISTANCE BACKWARD for this many feet: 3
WAIT for this many seconds: .5
SPIN COUNTERCLOCKWISE this many degrees: 100
ALAMANADE
SPIN AROUND COUNTERCLOCKWISE this many times: 1.25
SPIN COUNTERCLOCKWISE this many degrees: 45
MOVE DISTANCE FORWARD for this many feet: 4
WAIT for this many seconds: .5
MOVE DISTANCE BACKWARD for this many feet: 4
SPIN CLOCKWISE this many degrees: 45
```

```
MOVE DISTANCE FORWARD for this many feet: 2
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 5
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 180
JUMP to the line called "S
Q
```

ALAMANDE

```
MOVE DISTANCE FORWARD for this many feet: 1
SPIN COUNTERCLOCKWISE this many degrees: 40
MOVE DISTANCE FORWARD for this many feet: 1
SPIN CLOCKWISE this many degrees: 40
MOVE DISTANCE FORWARD for this many feet: 1
SPIN COUNTERCLOCKWISE this many degrees: 40
MOVE DISTANCE FORWARD for this many feet: 1
SPIN CLOCKWISE this many degrees: 20
Q
```

ACTIVITY 10: ROBOT BALLET

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPIN AROUND COUNTERCLOCKWISE this many times: 2
WALTZ1
WALTZ1
MOVE DISTANCE FORWARD for this many feet: 3
SPIN AROUND CLOCKWISE this many times: 1
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 2
SPIN AROUND COUNTERCLOCKWISE this many times: 1
SPIN COUNTERCLOCKWISE this many degrees: 45
MOVE DISTANCE BACKWARD for this many feet: 3
SPIN AROUND CLOCKWISE this many times: 1
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 3
SPIN COUNTERCLOCKWISE this many degrees: 45
MOVE DISTANCE FORWARD for this many feet: 2
WALTZ1
```

```
WALTZ1
SPIN CLOCKWISE this many degrees: 45
MOVE DISTANCE BACKWARD for this many feet: 4
SPIN AROUND CLOCKWISE this many times: 2
MOVE TIMED FORWARD this many seconds: .2
SPIN AROUND COUNTERCLOCKWISE this many times: 1
MOVE TIMED FORWARD this many seconds: .2
SPIN COUNTERCLOCKWISE this many degrees: 360
MOVE TIMED FORWARD this many seconds: .2
SPIN AROUND COUNTERCLOCKWISE this many times: 1
SPIN COUNTERCLOCKWISE this many degrees: 45
MOVE DISTANCE FORWARD for this many feet: 2
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE BACKWARD for this many feet: 4
WALTZ1
WALTZ1
SPIN CLOCKWISE this many degrees: 720
JUMP to the line called "S
Q
```

SECTION B: SENSING DEVICES

ACTIVITY 1: RESPOND WHEN ANY BUMPER IS TOUCHED

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE TIMED FORWARD for this many seconds: 2
MOVE TIMED BACKWARD for this many seconds: 2
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE TIMED FORWARD for this many seconds: 2
WAIT this many seconds: 1
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE TIMED BACKWARD for this many seconds: 2
WAIT this many seconds: 1
JUMP to the line called "S
Q
```

ACTIVITY 2: RESPOND IF FRONT AND REAR BUMPERS ARE TOUCHED

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
```

```
EXIT IF FRONT+REAR BUMPER PRESS
REPEAT THIS LOOP
MOVE TIMED FORWARD for this many seconds: 2
WAIT this many seconds: 1
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE TIMED BACKWARD for this many seconds: 2
WAIT this many seconds: 1
JUMP to the line called "S
Q
```

Let's Experiment Some More

After line 12, add:

```
TURN ON THE HORN
WAIT this many seconds: 1
BEGIN A LOOP
EXIT IF FRONT+REAR BUMPER PRESS
REPEAT THIS LOOP
TURN OFF THE HORN
Q
```

ACTIVITY 3: RESPOND IF THIS BUMPER IS TOUCHED

Let's Experiment

EDIT the task from Activity 2. Replace each bumper command with the new command.

```
Line 4 - EXIT IF THIS BUMPER is touched: #1
Line 9 - EXIT IF THIS BUMPER is touched: #2
Line 16 - EXIT IF THIS BUMPER is touched: #3
```

Let's Experiment Some More

Continue the same programming pattern. Add the following in the right places:

```
EXIT IF THIS BUMPER is touched: 4
SPIN CLOCKWISE this many degrees: 360
EXIT IF THIS BUMPER is touched: 5
SPIN COUNTERCLOCKWISE this many degrees: 360
```

```
EXIT IF THIS BUMPER is touched: 6
SPIN CLOCKWISE this many degrees: 720
EXIT IF THIS BUMPER is touched: 7
MOVE DISTANCE FORWARD this many feet: 1
MOVE DISTANCE BACKWARD this many feet: 1
EXIT IF THIS BUMPER is touched: 8
MOVE DISTANCE FORWARD this many feet: 2
SPIN COUNTERCLOCKWISE this many degrees: 180
MOVE DISTANCE FORWARD this many feet: 2
```

ACTIVITY 4: ALL OF THE BUMPER COMMANDS TOGETHER

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE FORWARD
BEGIN A LOOP
EXIT IF THIS BUMPER is touched: 2
REPEAT THIS LOOP
PIVOT ON RIGHT CLOCKWISE
BEGIN A LOOP
EXIT IF THIS BUMPER is touched: 3
REPEAT THIS LOOP
MOVE BACKWARD
BEGIN A LOOP
EXIT IF THIS BUMPER is touched: 4
REPEAT THIS LOOP
PIVOT ON LEFT COUNTERCLOCKWISE
BEGIN A LOOP
EXIT IF THIS BUMPER is touched: 6
REPEAT THIS LOOP
STOP ALL MOTION
BEGIN A LOOP
EXIT IF FRONT+REAR BUMPER PRESS
REPEAT THIS LOOP
JUMP to the line called "S
Q
```

ACTIVITY 5: RESPOND WHEN SONAR ACTIVATED

Let's Experiment

```
PREPARE THE ROBOT
```

```
CALL this robot task line "S
TURN ON THE HORN
WAIT this many seconds: 2
BEGIN A LOOP
TURN ON THE FLASHING LIGHTS
EXIT IF SONAR distance is less than 95
REPEAT THIS LOOP
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
CALL this robot task line "S
TURN ON THE FLASHING LIGHTS
MOVE FORWARD
BEGIN A LOOP
EXIT IF SONAR distance valaue is less than 95
REPEAT THIS LOOP
STOP ALL MOTION
SPIN CLOCKWISE this many degrees: 90
JUMP to the line called "S
Q
```

ACTIVITY 6: MEASURING SONAR DISTANCES

Let's Experiment

EDIT your previous sonar task. For the command "EXIT IF SONAR distance values is less than...", try different values.

Let's Experiment Some More

Choose a particular distance value and move different objects in front of RB5X at different distances.

ACTIVITY 7: USING SONAR AND BUMPERS TOGETHER

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
```

```
MOVE FORWARD
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
EXIT IF SONAR distance value is less than 95
REPEAT THIS LOOP
SPIN CLOCKWISE this many degrees: 90
MOVE FORWARD
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
EXIT IF SONAR distance value is less than 125
REPEAT THIS LOOP
PIVOT ON RIGHT CLOCKWISE
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 1
EXIT IF SONAR distance value is less than 95
JUMP to the line called "S
Q
```

ACTIVITY 8: STAYING OUT OF THE WAY

```
PREPARE THE ROBOT
CALL this robot task line "S
TURN ON THE FLASHING LIGHTS
PICK A RANDOM DIRECTION
MOVE FORWARD
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
EXIT IF SONAR distance value is less than 95
REPEAT THIS LOOP
MOVE DISTANCE BACKWARD for this many feet: .5
SPIN CLOCKWISE this many degrees: 90
WAIT RANDOMLY up to this many seconds 1
JUMP to the line called "S
Q
```

ACTIVITY 9: EXPLORING INFRARED

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
BEGIN A LOOP
PREPARE THE ROBOT
CLEAR ALL ITEMS
```

```
BEGIN A LOOP
PIVOT ON LEFT COUNTERCLOCKWISE
EXIT IF THE TAPE IS SENSED
REPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
MOVE FORWARD TIL TAPE NOT SENSED
PREPARE THE ROBOT
CLEAR ALL ITEMS
BEGIN A LOOP
PIVOT ON RIGHT CLOCKWISE
EXIT IF THE TAPE IS SENSED
REPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
MOVE FORWARD TIL TAPE NOT SENSED
REPEAT THIS LOOP
SPIN CLOCKWISE this many degrees: 180
JUMP to the line called "S
Q
```

ACTIVITY 10: FIND THE CHARGER

The standard solution is to use X CHARGER FINDER.

Once you have tried this to your satisfaction, why not see if you can improve on it. (There may also be robot tasks where you want to give the robot direct instructions about how to get to the charger.)

SECTION C: AUDIO AND VISUAL COMMUNICATION

ACTIVITY 1: SOUND PATTERN #1

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
TURN ON THE HORN
WAIT this many seconds 1
TURN OFF THE HORN
WAIT this many seconds .3
TURN ON THE HORN
WAIT this many seconds .3
TURN OFF THE HORN
WAIT this many seconds .3
TURN ON THE HORN
WAIT this many seconds .3
TURN OFF THE HORN
WAIT this many seconds .3
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
CALL this robot task line "S
LONG
SHORT
LONG
LONG
SHORT
SHORT
MEDIUM
MEDIUM
LONG
SHORT
MEDIUM
LONG
LONG
```

```
LONG
JUMP to the line called "S
Q
```

LONG

```
TURN ON THE HORN
WAIT this many seconds 1
TURN OFF THE HORN
WAIT this many seconds .3
Q
```

SHORT

```
TURN ON THE HORN
WAIT this many seconds .3
TURN OFF THE HORN
WAIT this many seconds .3
Q
```

MEDIUM

```
TURN ON THE HORN
WAIT this many seconds .6
TURN OFF THE HORN
WAIT this many seconds .3
Q
```

ACTIVITY 2: SOUND PATTERN TO MUSIC

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A COUNTED LOOP called "BEAT beginning at 1
ending at 10
RHYTHM
WAIT this many seconds 10
JUMP to the line called "S
Q
```

RHYTHM

```
HONK the horn for this many seconds: .3
WAIT for this many seconds: .03
HONK the horn for his many seconds: .3
WAIT for this many seconds: .1
```

Let's Experiment Some More

MELODY

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
PHRASE 1
PHRASE 2
PHRASE 1
PHRASE 2
PHRASE 2
PHRASE 2
PHRASE 3
PHRASE 3
PHRASE 1
PHRASE 1
JUMP to the line called "S
Q
```

PHRASE 1

```
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .9
WAIT for this many seconds .05
```

PHRASE 2

```
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .9
WAIT for this many seconds .05
```

PHRASE 3

```
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .01
HONK the horn for this many seconds .3
WAIT for this many seconds .05
```

RHYTHM and MELODY are based on the song "Old McDonald Had a Farm."

ACTIVITY 3: MORSE CODE

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
S
O
S
R
O
B
O
T
I
N
DEE
I
```

```
S
T
R
E
S
S
WAIT this many seconds 3
JUMP to the line called "S
Q
```

LONG1

```
HONK the horn for this many seconds 1
WAIT this many seconds .3
Q
```

SHORT1

```
HONK the horn for this many seconds .3
WAIT this many seconds .3
Q
```

B

```
LONG1
SHORT1
SHORT1
SHORT1
Q
```

E

```
SHORT1
Q
```

DEE

```
LONG1
SHORT1
SHORT1
Q
```

I

```
SHORT1
SHORT1
Q
```

N

```
LONG1
SHORT1
Q
```

O

```
LONG1
LONG1
LONG1
Q
```

R

```
SHORT1
LONG1
SHORT1
Q
```

S

```
SHORT1
SHORT1
SHORT1
Q
```

T

```
LONG1
Q
```

ACTIVITY 4: LIGHT PATTERN #1 OR A BRIGHT IDEA

```
PREPARE THE ROBOT
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
Q
```

ACTIVITY 5: LIGHT PATTERN #2

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
TURN ON LED number 1
TURN ON LED number 2
TURN ON LED number 3
TURN ON LED number 4
TURN ON LED number 5
TURN OFF LED number 1
TURN OFF LED number 2
TURN OFF LED number 3
TURN OFF LED number 4
TURN OFF LED number 5
```

```
WAIT this many seconds 3
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
CALL this robot task line "S
TURN ON LED number 5
WAIT this many seconds .2
TURN ON LED number 1
WAIT this many seconds .2
TURN ON LED number 2
WAIT this many seconds .2
TURN ON LED number 3
WAIT this many seconds .2
TURN ON LED number 4
WAIT this many seconds 1
TURN OFF LED number 4
WAIT this many seconds .2
TURN OFF LED number 3
WAIT this many seconds .2
TURN OFF LED number 2
WAIT this many seconds .2
TURN OFF LED number 1
WAIT this many seconds .2
TURN OFF LED number 5
WAIT this many seconds 1
JUMP to the line called "S
Q
```

ACTIVITY 6: THE FESTIVE ROBOT

Let's Experiment

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
TURN ON LED number 5
WAIT this many seconds .5
TURN ON LED number 1
WAIT this many seconds .1
TURN ON LED number 3
```

```
WAIT this many seconds .1
TURN ON THE FLASHING LIGHTS
WAIT this many seconds 2
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .3
TURN ON THE FLASHING LIGHTS
WAIT this many seconds 1
TURN OFF THE FLASHING LIGHTS
WAIT this many seconds .1
TURN OFF LED number 3
WAIT this many seconds .1
TURN OFF LED number 1
WAIT this many seconds .1
TURN OFF LED number 5
WAIT this many seconds 1
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
WAIT this many seconds 2
TURN OFF THE FLASHING LIGHTS
TURN ON LED number 1
TURN ON LED number 2
TURN ON LED number 3
TURN ON LED number 4
TURN ON LED number 5
WAIT this many seconds 2
TURN OFF LED number 1
TURN OFF LED number 2
TURN OFF LED number 3
TURN OFF LED number 4
TURN OFF LED number 5
WAIT this many seconds 1
TURN ON LED number 1
TURN ON LED number 5
TURN ON LED number 3
WAIT this many seconds 1
TURN OFF LED number 3
TURN OFF LED number 5
TURN OFF LED number 1
```

```
WAIT this many seconds 1
TURN ON LED number 1
WAIT this many seconds .5
TURN OFF LED number 1
TURN ON LED number 5
WAIT this many seconds .5
TURN OFF LED number 5
TURN ON LED number 3
WAIT this many seconds .5
TURN OFF LED number 3
WAIT this many seconds .5
TURN ON LED number 5
WAIT this many seconds 1
TURN OFF LED number 5
Q
```

ACTIVITY 7: PUTTING SOUNDS AND LIGHTS TOGETHER

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
HONK the horn for this many seconds .3
TURN ON THE FLASHING LIGHTS
MOVE DISTANCE FORWARD for this many feet: 5
TURN OFF THE FLASHING LIGHTS
SPIN CLOCKWISE this many degrees: 90
HONK the horn for this many seconds .5
TURN ON THE FLASHING LIGHTS
MOVE DISTANCE FORWARD for this many feet: 8
TURN OFF THE FLASHING LIGHTS
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 3.5
SPIN COUNTERCLOCKWISE this many degrees: 90
HONK the horn for this many seconds .5
TURN ON THE FLASHING LIGHTS
MOVE DISTANACE FORWARD for this many feet: 8
TURN OFF THE FLASHING LIGHTS
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 2
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: .5
JUMP to the linen called "S
Q
```

ACTIVITY 8: MORE MORSE CODE

EDIT the task for Activity 3 in this section and add the following after WAIT for this many seconds: 3:

```
S1
O1
S1
R1
O1
B1
O1
T1
I1
N1
D1
I1
S1
T1
R1
E1
S1
S1
WAIT for this many seconds 3
Q

B1

LONGLITE
SHORTLITE
SHORTLITE
SHORTLITE
Q

E1

SHORTLITE
Q

D1

LONGLITE
SHORTLITE
```

```
SHORTLITE
Q
```

I1

```
SHORTLITE
SHORTLITE
Q
```

N1

```
LONGLITE
SHORTLITE
Q
```

O1

```
LONGLITE
LONGLITE
LONGLITE
Q
```

R1

```
SHORTLITE
LONGLITE
SHORTLITE
Q
```

S1

```
SHORTLITE
SHORTLITE
SHORTLITE
Q
```

T1

```
LONGLITE
Q
```

SHORTLITE

```
TURN ON THE FLASHING LIGHTS
WAIT for this many seconds .3
TURN OFF THE FLASHING LIGHTS
WAIT for this many seconds .3
Q
```

LONGLITE

```
TURN ON THE FLASHING LIGHTS
WAIT for this many seconds 1
TURN OFF THE FLASHING LIGHTS
WAIT for this many seconds .3
Q
```

ACTIVITY 9: NEW YEAR'S EVE

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SHORTLITE
SHORTLITE
LONGLITE
LONGLITE
TURN ON THE FLASHING LIGHTS
LONG1
LONG1
HONK the horn for this many seconds 60
SHORT1
SHORT1
TURN OFF THE FLASHING LIGHTS
LONGLITE
LONGLITE
SHORTLITE
SHORTLITE
SHORTLITE
JUMP to the line called "S
Q
```

ACTIVITY 10: SENTRY ROBOT

```
PREPARE THE ROBOT
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
CALL this robot task line "S
BEGIN A LOOP
EXIT IF SONAR distance value is less than 300
MORE MORSE CODE
REPEAT THIS LOOP
WAIT this many seconds 2
JUMP to the line called "S
Q
```

SECTION D: SPEECH PROGRAMMING

ACTIVITY 1: PROGRAMMING IN PHONEMES OR WHAT WE WRITE ISN'T WHAT WE SAY

Let's Experiment

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "TALK with the phonemes
"F.R.EH.N.D.L.L.Y.STOP.
CALL this robot task line "S
SPEAK the phrase called "TALK
WAIT this many seconds: 2
JUMP to the line called "S
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "TALK with the phonemes
"F.R.EH.N.D.L.L.Y.STOP.
LOAD THE PHRASE called "TALK1 with the phonemes
"R.O1.B.AH1.T.STOP."
LOAD THE PHRASE called "TALK2 with the phonemes
"H.H.EH.L.L.OO.O1.STOP.
CALL this robot task line "S
SPEAK the phrase called "TALK
WAIT for this many seconds: 2
SPEAK the phrase called "TALK1
WAIT for this many seconds: 2
SPEAK the phrase called "TALK2
WAIT for this many seconds: 2
JUMP to the line called "S
Q
```

ACTIVITY 2: REPEATING A SIMPLE SENTENCE

Let's Experiment

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "SENTENCE with the phonemes
"H.EH.L.P.PA1.DT.AW2.UH2.G.PA1.A.Z.Z.PA1.A.N.N.PA1.
D.THV.U.PA1.S.T.O.R.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "SENTENCE
JUMP to the line called "S
Q
```

Let's Experiment Some More

Substitute the following phonemes in LOAD THE PHRASE:
"H.H.EH.L.L.P.PA1.PA1.DT.AW2.AW2.UH2.G.PA1.A.Z.Z.PA1.
A.N.N.PA1.D.THV.U.PA1.S.T.O.O.R.STOP."

NOTE: In these examples, the robot says, "Help, dog is in the store."

ACTIVITY 3: A ROBOT INTRODUCTION

Let's Experiment

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "INTRO with the phonemes
"H.H.EH.L.L.OO.O1.PA1.AH.E.E.PA1.AE.AE.M.PA1.
AH1.AH1.R.PA0.B.Y.Y.PA1.F.AH.Y.V.PA1.D.THV.U.PA1.
I.N.T.EH.L.L.UH3.D.J.EH3.N.T.PA1.R.O1.B.AH1.T.STOP.
LOAD THE PHRASE called "INTRO1 with the phonemes
"AH.E.E.PA1.K.AE.AE.N.PA1.M.U1.U1.V.STOP.
LOAD THE PHRASE called "INTRO2 with the phonemes
"AH.E.E.PA1.K.AE.AE.N.PA1.T.AW1.AW1.K.STOP.
LOAD THE PHRASE called "INTRO3 with the phonemes
"AH.E.E.PA1.L.L.AH1.E.K.PA1.T.U1.U1.U1.PA1.
H.EH.L.P.PA1.M.AH.Y.PA1.F.R.EH2.N.DT.Z.Z.STOP.
CALL this robot task line "S
SPEAK the phrase called "INTRO
```

```
SPEAK the phrase called "INTRO1
SPEAK the phrase called "INTRO2
SPEAK the phrase called "INTRO3
WAIT for this many seconds: 3
JUMP to the line called "S
Q
```

Let's Experiment Some More

Using the same task, before each of the SPEAK commands, insert the following:

```
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
```

NOTE: In this example, the robot says the following:
1. Hello, I am RB5X: The Intelligent Robot.
2. I can move.
3. I can talk.
4. I like to help my friends.

ACTIVITY 4: DELIVER AN IMPORTANT MESSAGE

Let's Experiment

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "MESSAGE with the phonemes
"AH.E.E.PA1.H.H.AE1.V.PA1.I.N.F.O.R.M.EH2.E.SH.UH3.N.
STOP.
LOAD THE PHRASE called "MESSAGE1 with the phonemes
"AH.U1.R.PA1.G.EH.S.T.S.Z.PA1.AH1.AH1.R.PA1.K.UH1.UH2.
M.I2.NG.STOP.
BEGIN A LOOP
SPEAK the phrase called "MESSAGE
MOVE DISTANCE FORWARD this many feet: 5
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "MESSAGE1
SPIN CLOCKWISE this many degrees: 180
Q
```

Let's Experiment Some More

After you have completed the task above, add the following:

```
TURN ON THE FLASHING LIGHTS
MOVE FORWARD
Q
```

NOTE: In this example, the robot says the following:
1. I have information.
2. Our guests are coming.

ACTIVITY 5: THE ROBOT REMINDER

Let's Experiment

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called "REMIND with the phonemes
"M.EH2.E.K.PA1.D.THV.U.PA1.B.EH2.EH2.EH2.DT.STOP.
LOAD THE PHRASE called "REMIND1 with the phonemes
"P.OO1.OO1.T.PA1.AH.U1.T.PA1.D.THV.U.PA1.K.AE.T.STOP.
LOAD THE PHRASE called "REMIND2 with the phonemes
"P.I3.I3.K.PA1.UH1.P.PA1.D.THV.U.PA1.B.U.U.K.Z.Z.STOP.
LOAD THE PHRASE called "REMIND3 with the phonemes
"R.Y.CH.AW2.AW2.R.D.J.PA1.D.THV.U.PA1.R.O1.B.AH1.T.STOP.
LOAD THE PHRASE called "REMIND4 with the phonemes
"G.O1.O1.PA1.T.U1.U1.U1.PA1.D.THV.U.PA1.S.T.O.R.STOP.
CALL this robot task line "S
SPEAK the phrase called "REMIND
SPEAK the phrase called "REMIND1
SPEAK the phrase called "REMIND2
SPEAK the phrase called "REMIND3
SPEAK the phrase called "REMIND4
WAIT for this many seconds: 120
JUMP to the line called "S
Q
```

Let's Experiment Some More

After preparing the robot and loading the phrases, rewrite the program as follows:

```
BEGIN A LOOP
```

```
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "REMIND 2
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "REMIND1
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "REMIND4
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called "REMIND3
Q
```

NOTE: In this example, the robot says the following:

1. Make the bed.
2. Put out the cat.
3. Pick up the books.
4. Recharge the robot.
5. Go to the store.

ACTIVITY 6: THE ALIEN ROBOT

Let's Experiment

EDIT the task you wrote in Acitivty 2, "Repeating a Simple Sentence." Change the phonemes in LOAD THE PHRASE to the following:

"AW.V.L.A.PA1.U1.U1.S.T.EH2.EH2.PA1.EH2.EH2.S.P.AW.N.Y.OO.LL.
STOP."

Your robot is saying, "Habla Usted espanol?" ("Do you speak Spanish?")

Let's Experiment Some More

EDIT the "Repeating a Simple Sentence" task again or DEFINE a new task. LOAD THE PHRASE called "PIG LATIN" with the following phonemes:

"AH.E.E.EH2.Y.PA1.AE.AE.N.N.K.EH2.Y.PA1.Y.Y.K.S.P.EH2.
Y.PA1.A.G.P.EH2.Y.PA1.AE.T.A.N.L.EH2.Y.STOP."

Your robot is saying, "lay ancay eakspay igpay atinlay." ("I can speak Pig Latin.")

ACTIVITY 7: ROBOT INSTRUCTIONS

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "SANDWICH with phonemes:
"L.EH.T.Z.Z.PA1.N.M.EH2.K.PA1.AH1.AH2.PA1.S.S.AE.N.D.
W.A.CH.STOP.
LOAD THE PHRASE called: "SANDWICH1 with phonemes:
"G.EH.T.PA1.T.U1.U1.U1.PA1.S.L.AH.E.S.EH.Z.Z.PA1.UH2.UH2.V.
PA1.B.R.EH.EH.DT.STOP.
LOAD THE PHRASE called "SANDWICH2 with phonemes:
"S.P.R.EH.DT.PA1.B.UH1.DT.ER.PA1.AW1.N.N.PA1.B.O1.THV.
PA1.S.L.AH.E.S.EH.Z.Z.STOP.
LOAD THE PHRASE called "SANDWICH3 with phonemes:
"S.P.R.EH.DT.PA1.P.E1.Y.N.UH1.T.PA1.B.UH1.DT.ER.PA1.
AW1.N.N.PA1.U1.UH1.N.PA1.S.L.AH.E.S.STOP.
LOAD THE PHRASE called "SANDWICH4 with phonemes:
"S.P.R.EH.DT.PA1.D.J.EH.L.L.Y.PA1.AW1.N.N.PA1.
D.THV.U.PA1.UH.THV.ER.STOP.
LOAD THE PHRASE called "SANDWICH5 with phonemes:
"P.OO1.OO1.T.D.THV.U.PA1.T.U1.U1.U1.PA1.S.L.AH.E.S.EH.Z.Z.
PA1.T.U1.U1.G.EH.THV.ER.STOP.
LOAD THE PHRASE called "SANDWICH6 with phonemes:
"E.E.T.PA1.AE.N.D.PA1.EH.N.D.J.O1.Y.STOP.
CALL this robot task line "S
SPEAK the phrase called: "SANDWICH
WAIT this many seconds 1
SPEAK the phrase called: "SANDWICH1
WAIT this many seconds 5
SPEAK the phrase called: "SANDWICH2
WAIT this many seconds 5
SPEAK the phrase called: "SANDWICH3
WAIT this many seconds 5
SPEAK the phrase called: "SANDWICH4
WAIT this many seconds 5
SPEAK the phrase called: "SANDWICH5
WAIT this many seconds .5
SPEAK the phrase called: "SANDWICH6
WAIT this many seconds 20
JUMP to the line called "S
Q
```

NOTE: The robot says the following phrases in the order given:
1. Let's make a sandwich.
2. Get two slices of bread.
3. Spread butter on both slices.
4. Spread peanut butter on one slice.
5. Spread jelly on the other slice.
6. Put the two slices together.
7. Eat and enjoy.

ACTIVITY 8: A CONVERSATION WITH YOUR ROBOT

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "VISIT with phonemes:
"H.H.EH.L.L.O1.PA1.W.AH1.AH1.T.PA1.H.H.AE1.AE.V.PA1.
E.U1.U1.PA1.B.EH1.EH3.N.PA1.D.U1.U1.I1.N.NG.PA1.
T.U1.U1.D.A1.I3.Y.STOP.
LOAD THE PHRASE called: "VISIT1 with phonemes:
"W.EH.L.L.PA1.PA1.D.THV.AE.T.PA1.D.UH2.UH1.Z.N.T.PA1.
S.S.AH1.OO.N.DT.PA1.T.U1.U1.U1.PA1.B.AE.D.STOP.
LOAD THE PHRASE called: "VISIT2 with phonemes:
"A.Z.Z.PA1.D.THV.AE.T.PA1.AW.L.L.PA1.D.THV.AE.T.PA1.
H.H.AE1.EH3.P.UH3.N.D.STOP.
LOAD THE PHRASE called: "VISIT3 with phonemes:
"AH.E.E.PA1.S.E1.Y.STOP.
LOAD THE PHRASE called: "VISIT4 with phonemes:
"W.AH1.AH1.T.PA1.AH1.AH1.R.PA1.E.U1.U1.PA1.
P.L.AE1.EH3.N.I1.N.NG.PA1.T.U1.U1.U1.PA1.D.U1.U1.U1.PA1.
T.U1.M.AH1.R.O1.STOP.
LOAD THE PHRASE called: "VISIT5 with phonemes:
"D.THV.AE.T.PA1.S.S.AH1.OO.N.DT.Z.Z.PA1.L.L.AH1.E.K.PA1.
F.UH1.UH1.N.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "VISIT
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "VISIT1
TURN ON THE FLASHING LIGHTS
WAIT this many seconds .5
SPEAK the phrase called: "VISIT2
TURN OFF THE FLASHING LIGHTS
```

```
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "VISIT3
WAIT this many seconds 1
SPEAK the phrase called: "VISIT4
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "VISIT5
JUMP to the line called "S
Q
```

NOTE: The robot says these phrases in the following order:
1. Hello, what have you been doing today?
2. Well, that doesn't sound too bad.
3. Is that all that happened?
4. I see.
5. What are you planning to do tomorrow?
6. That sounds like fun.

ACTIVITY 9: A PLAY FOR ROBOT AND TWO ACTORS

SETTING: An alien world in a far-off galaxy.
CHARACTERS: 1st space traveler
2nd space traveler
The Royal Robot Guard of the planet Xanero.

SCENE: Two space travelers from Earth have just disembarked from their space ship on the planet Xanero and are inspecting the spot where they have landed. Although there are strange outcroppings of what appear to be a combination of stone and living material, the spot does not look friendly for Earthlings.

1st space traveler: What kind of hostile world have we been sent to this time?

2nd space traveler: It's hard to say, but it doesn't look like the kind of place where you'd expect to find life.

1st space traveler: Well, our mission is to find worlds that have life on them and could support other life. This one doesn't look promising.

2nd space traveler: I agree. From all of the information we collected flying over this planet, the whole place will no doubt be the same. The funny thing is, though, we kept picking up some kind of signals

that sounded like communication signals.

1st space traveler: Maybe we'd better look around a bit.

(Space travelers take out some equipment to pick up communication signals and adjust dials, etc.
RB5X moves onto the scene behind them, making beeping sounds.)

1st space traveler: Hey! Our equipment is picking up those sounds again. Look! They seem to be getting stronger!

2nd space traveler: What do you mean, stronger. I can hear something myself, without that box, and it's right behind us! Turn around nice and slow, just in case something is back there.

(Travelers turn slowly in the direction of RB5X.)

1st space traveler: What the...?! (In a low voice.) There it is, just staring at us.

2nd space traveler: Let's try to communicate with it. Try some signals from the Alien Communicator. (More beeping sounds.)

RB5X: 1) I can interpret your language. 2) What is your mission here?

1st space traveler: Uh, uh, uh, we are from the planet Earth. We are exploring this galaxy for planets that support life.

RB5X: 3) Are your interests friendly?

2nd space traveler: Oh, yes! We are just gathering scientific information.

RB5X: 4) Are you armed?

1st and 2nd space travelers (together): Well, ah, um...

RB5X: 5) I know that you are. 6) You have no need of weapons here. 7) We are a friendly race. 8) We cooperate with all other life forms in the galaxy.

1st space traveler: What do you call yourselves?

RB5X: 9) We are the ancient race of Roboticus.

2nd space traveler: Do you have cities? Can we, perhaps, visit with you and others of your race to learn more about your customs?

RB5X: 10) Come with me. 11) Leave your arms behind.

(Space travelers drop the weapons they are holding and start to move toward RB5X.)

RB5X: 12) Please leave all of your weapons.

(Travelers take out small, concealed weapons and leave them.)

1st space traveler: (Whispering) I'm not sure how it knows, but it sure does !

2nd space traveler: Yeh! We'd better be sure to be honest with these fellows.

(All exit in direction that RB5X came from.)

CURTAIN

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "PLAY1 with phonemes:
"AH.E.E.PA1.K.AE.AE.N.PA1.I.N.T.ER.P.R.EH1.T.PA1.
E.O.O.R.PA1.L.AE1.EH3.NG.G.W.I1.D.J.STOP.
LOAD THE PHRASE called: "PLAY2 with phonemes:
"W.AH1.AH1.T.PA1.A.Z.Z.PA1.I.E.O.O.R.PA1.M.I.1.SH.UH3.N.PA1.
H.H.AY.I3.R.STOP.
LOAD THE PHRASE called: "PLAY3 with phonemes:
"AH1.AH1.R.PA1.E.O.O.R.PA1.I.N.T.R.EH.S.T.S.PA1.
F.R.EH.N.D.L.L.Y.STOP.
LOAD THE PHRASE called: "PLAY4 with phonemes:
"AH1.AH1.R.PA1.E.U1.U1.PA1.AH1.AH1.R.M.D.STOP.
LOAD THE PHRASE called: "PLAY5 with phonemes:
"AH.E.E.PA1.N.OO1.O1.PA1.D.THV.AE.T.PA1.E.U1.U1.PA1.
AH1.AH1.R.STOP.
LOAD THE PHRASE called: "PLAY6 with phonemes:
"E.U1.U1.PA1.H.H.AE1.AE.V.PA1.N.OO1.O1.PA1.N.E1.Y.D.PA1.
UH2.UH2.V.PA1.AH1.R.M.Z.Z.PA1.H.H.AY.I3.R.STOP.
LOAD THE PHRASE called: "PLAY7 with phonemes:
"W.E.E.PA1.AH1.AH1.R.PA1.AH1.AH2.PA1.F.R.EH.N.D.L.L.Y.PA1.
R.A1.AY.S.STOP.
LOAD THE PHRASE called: "PLAY8 with phonemes:
"W.E.E.PA1.K.O1.AH1.P.ER.EH2.E.T.PA1.W.I1.I3.TH.PA1.
AW.L.L.PA1.UH..THV.ER.PA1.L.UH3.AH2.Y.F.PA1.
A.N.N.PA1.D.THV.U.PA1.G.AE1.AH2.L.I2.G.S.T.STOP.
```

```
SPACE TRAVEL 1
Q


SPACE TRAVEL 1

LOAD THE PHRASE called: "PLAY9 with phonemes:
"W.E.E.PA1.AH1.AH1.R.PA1.D.THV.U.PA1.A1.AY.Y.N.CH.UH3.N.T.
PA1.R.A1.AY.S.PA1.UH2.UH2.V.PA1.R.O1.B.AH1.T.I.K.UH.S.STOP.
LOAD THE PHRASE called: "PLAY10 with phonemes:
"K.UH1.UH2.M.PA1.W.I1.I3.TH.PA1.M.Y.Y.STOP.
LOAD THE PHRASE called: "PLAY11 with phonemes:
"L.L.E1.Y.V.PA1.E.O.O.R.PA1.AH1.R.M.Z.Z.PA1.
B.E1.Y.H.AH1.EH3.Y.N.D.STOP.
LOAD THE PHRASE called: "PLAY12 with phonemes:
"AW.L.L.PA1.UH2.UH2.V.PA1.D.THV.EH2.EH2.M.STOP.
CALL this robot task line "S
WAIT this many seconds 60
TURN ON THE FLASHING LIGHTS
MOVE DISTANCE FORWARD for this many feet: 6
HONK the horn for this many seconds .2
HONK the horn for this many seconds .2
WAIT this many seconds .2
HONK the horn for this many seconds .2
WAIT this many seconds 30
SPEAK the phrase called: "PLAY1
SPEAK the phrase called: "PLAY2
WAIT this many seconds 1
SPEAK the phrase called: "PLAY3
WAIT this many seconds .5
SPEAK the phrase called: "PLAY4
WAIT this many seconds .5
SPEAK the phrase called: "PLAY5
SPEAK the phrase called: "PLAY6
SPEAK the phrase called: "PLAY7
SPEAK the phrase called: "PLAY8
WAIT this many seconds .5
SPEAK the phrase called: "PLAY9
WAIT this many seconds 1
SPEAK the phrase called: "PLAY10
SPEAK the phrase called: "PLAY11
WAIT this many seconds 1
SPEAK the phrase called: "PLAY12
SPIN CLOCKWISE this many degrees: 180
MOVE DISTANCE FORWARD for this many feet: 6
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
```

```
REPEAT THIS LOOP
JUMP to the line called "S
Q
```

ACTIVITY 10: THE ROBOT PSYCHOLOGIST

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "PSYCH1 with phonemes:
"W.AH1.AH1.T.PA1.W.IU.IU.OO1.D.PA1.E.U1.U1.PA1.L.L.AH1.E.K.
PA1.T.U1.U1.U1.PA1.T.AW1.AW1.K.PA1.UH1.B.AH1.OO.T.STOP.
LOAD THE PHRASE called: "PSYCH2 with phonemes:
"E.U1.U1.PA1.N.OO1.O.PA1.E.U1.U1.PA1.K.AE.AE.N.PA1.
T.EH.L.L.PA1.M.Y.Y.PA1.EH.N.Y.THV.I1.I3.NG.STOP.
LOAD THE PHRASE called: "PSYCH3 with phonemes:
"Y1.EH3.EH1.S.PA1.PA1.PA1.PA1.T.EH.L.L.PA1.M.Y.Y.PA1.
S.UH1.UH2.M.PA1.M.O.R.STOP.
LOAD THE PHRASE called: "PSYCH4 with phonemes:
"AH.E.E.PA1.UH2.UH2.N.D.ER.S.T.AE1.EH3.N.D.STOP.
LOAD THE PHRASE called: "PSYCH5 with phonemes:
"D.THV.EH.R.PA1.D.THV.EH.R.PA1.EH.V.R.Y.Y.THV.I1.I3.NG.PA1.
W.I1.I3.L.L.PA1.B.E1.Y.PA1.AW.L.L.R.UH3.AH2.Y.T.STOP.
LOAD THE PHRASE called: "PSYCH6 with phonemes:
"N.N.AH1.OO.U1.PA1.H.H.AH1.OO.U1.PA1.D.U1.U1.U1.PA1.
E.U1.U1.PA1.R.E.E.L.Y.Y.PA1.F.Y.UH3.L.L.PA1.UH1.B.AH1.OO.T.
PA1.THV.I1.I3.NG.Z.Z.STOP.
LOAD THE PHRASE called: "PSYCH7 with phonemes:
"THV.I1.I3.NG.Z.Z.PA1.AH1.AH1.R.PA1.N.EH.V.ER.PA1.AE.Z.Z.PA1.
B.AE1.AE1.D.PA1.AE.Z.Z.PA1.D.THV.EH2.Y.PA1.S.Y.Y.M.STOP.
PSYCHOLOGIST
Q
```

PSYCHOLOGIST

```
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH1
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH2
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
```

```
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH3
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH4
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH5
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH6
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "PSYCH7
JUMP to the line called "S
Q
```

SECTION E: THE ROBOT ARM

ACTIVITY 1: EXPLORING THE SHOULDER

Let's Experiment

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

Let's Experiment Some More

```
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

ACTIVITY 2: WHAT IS A ROBOT ELBOW?

Let's Experiment

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
MOVE THE FOREARM (IN,OUT): IN for this many degrees 45
WAIT this many seconds .5
MOVE THE FOREARM (IN,OUT): IN for this many degrees 45
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 45
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 180
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

ACTIVITY 3: WRIST WIGGLING

Let's Experiment

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
TURN THE WRIST (CW,CCW): CW for this many degrees 90
TURN THE WRIST (CW,CCW): CCW for this many degrees 180
TURN THE WRIST (CW,CCW): CW for this many degrees 180
TURN THE WRIST (CW,CCW): CCW for this many degrees 180
TURN THE WRIST (CW,CCW): CW for this many degrees 90
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
```

```
TURN THE WRIST (CW,CCW): CCW for this many degrees 45
TURN THE WRIST (CW,CCW): CW for this many degrees 90
TURN THE WRIST (CW,CCW): CCW for this many degrees 90
TURN THE WRIST (CW,CCW): CW for this many degrees 90
TURN THE WRIST (CW,CCW): CCW for this many degrees 90
TURN THE WRIST (CW,CCW): CW for this many degrees 45
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

ACTIVITY 4: ROBOT GRIPPERS

Let's Experiment

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
TURN THE WRIST (CW,CCW): CCW for this many degrees 90
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
TURN THE WRIST (CW,CCW): CW for this many degrees 180
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 50
TURN THE WRIST (CW,CCW): CCW for this many degrees 180
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 75
TURN THE WRIST (CW,CCW): CW for this many degrees 180
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 65
TURN THE WRIST (CW,CCW): CCW for this many degrees 90
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 10
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

Let's Experiment Some More

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 70
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 70
```

```
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 100
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 70
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 50
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 50
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
Q
```

ACTIVITY 5: FIND THE CENTER, FIND THE LIMITS

Let's Experiment (Find the Center)

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
WAIT this many seconds 1
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
Q
```

Let's Experiment Some More (Find the Limits)

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 45
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE FOREARM (IN,OUT): IN for this many degrees 45
MOVE THE FOREARM (IN,OUT): IN for this many degrees 45
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
Q
```

ACTIVITY 6: EGGS IN THE BASKET

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
```

```
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
CALL this robot task line "S
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 5
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
REPEAT THIS LOOP
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 10
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 75
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 10
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 100
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
JUMP to the line called "S
Q
```

ACTIVITY 7: A ROBOT ASSEMLBY-LINE HELPER

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
BEGIN A COUNTED LOOP called "CORN beginning at 1
ending at 12
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 50
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 135
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
```

```
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 135
REPEAT THIS COUNTED LOOP for the counter 12
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 180
JUMP to the line called "S
Q
```

ACTIVITY 8: DRAW A SIMPLE GEOMETRIC FORM

Draw a Square

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 30
WAIT this many seconds 3
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 30
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 30
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 30
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 30
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 30
WAIT this many seconds 3
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
Q
```

ACTIVITY 9: ROBOT ARTIST

```
PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 30
```

WAIT this many seconds 3
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for this many degrees 5
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for this many degrees 5
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for this many degrees 2
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 10
MOVE THE FOREARM (IN,OUT): IN for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 2
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 2
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 10
MOVE THE FOREARM (IN,OUT): IN for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 17
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 3
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for this many degrees 10
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 95
Q

ACTIVITY 10: THE WRITING ROBOT

PREPARE THE ROBOT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180

```
WAIT this many seconds 3
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 8
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 4
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 2
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 6
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 6
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 6
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 10
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
Q
```

SECTION F: PUTTING IT ALL TOGETHER

ACTIVITY 1: THE ROBOT PATROL

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "WELL with phonemes:
"AW.L.L.PA1.A.Z.Z.PA1.U1.E.H2.L.L.STOP.
LOAD THE PHRASE called: "SEE with phonemes:
"AH.E.E.PA1.S.E1.Y.PA1.S.UH1.M.D.THV.I1.I3.NG.STOP.
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 1
REPEAT THIS LOOP
CALL this robot task line "S
BEGIN A LOOP
MOVE DISTANCE FORWARD for this many feet: 10
EXIT IF SONAR distance value is less than 120
WAIT this many seconds .5
SPEAK the phrase called: "SEE
REPEAT THIS LOOP
SPIN CLOCKWISE this many degrees: 90
SPEAK the phrase called: "WELL
BEGIN A LOOP
MOVE DISTANCE FORWARD for this many feet: 3
EXIT IF SONAR distance value is less than 120
WAIT this many seconds .5
SPEAK the phrase called: "WELL
BEGIN A LOOP
MOVE DISTANCE FORWARD for this many feet: 4
EXIT IF SONAR distance value is less than 120
WAIT this many seconds .5
SPEAK the phrase called: "SEE
MORSE CODE
REPEAT THIS LOOP
SPIN CLOCKWISE this many degrees: 45
SPEAK the phrase called: "WELL
BEGIN A LOOP
MOVE DISTANCE FORWARD for this many feet: 7
EXIT IF SONAR distance value is less than 120
MORE MORSE CODE
REPEAT THIS LOOP
SPIN CLOCKWISE this manyd degrees: 90
SPEAK the phrase called: "WELL
```

```
BEGIN A LOOP
MOVE DISTANCE FORWARD for this many feet: 7
EXIT IF SONAR distance value is less than 120
SPEAK the phrase called: "SEE
REPEAT THIS LOOP
JUMP to the line called "S
Q
```

NOTE: The robot says these phrases in the following order:
1. All is well.
2. I see something.

ACTIVITY 2: THE ROBOT EXERCISE LEADER

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "UP with phonemes:
"AH.R.M.Z.PA1.UH1.P.STOP.
LOAD THE PHRASE called: "DOWN with phonemes:
"AH.R.M.Z.PA1.D.AH.OO.N.STOP.
LOAD THE PHRASE called: "RIGHT with phonemes:
"R.UH3.AH2.Y.T.STOP.
LOAD THE PHRASE called: "LEFT with phonemes:
"L.EH.F.T.STOP.
LOAD THE PHRASE called: "SKY with phonemes:
"R.Y.Y.CH.PA1.F.O.R.PA1.D.T.HV.U.PA1.S.K.AH.E.E.STOP.
LOAD THE PHRASE called: "FLOOR with phonemes:
"T.UH1.CH.PA1.D.THV.U.PA1.F.L.O.R.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 180
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
SPEAK the phrase called: "UP
UP1
SPEAK the phrase called: "DOWN
DOWN1
WAIT this many seconds 1
SPEAK the phrase called: "RIGHT
SPIN CLOCKWISE this many degrees: 90
SPEAK the phrase called: "LEFT
SPIN COUNTERCLOCKWISE this many degrees: 180
SPIN CLOCKWISE this many degrees: 90
```

WAIT this many seconds 1
SPEAK the phrase called: "SKY
SKY
SPEAK the phrase called: "FLOOR
FLOOR
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for this many degrees 180
Q

UP1

MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 60
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 60

DOWN1

MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 60
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 60

SKY

MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 90

FLOOR

MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for this many degrees 90

ACTIVITY 3: ROBOT EXPRESS

PREPARE THE ROBOT
PREPARE THE VOICE

```
LOAD THE PHRASE called: "HUNGRY with phonemes:
"AH.E.E.PA1.W.AH1.N.T.PA1.AH1.AH2.PA1.P.Y.N.UH1.T.
PA1.B.UH1.DT.ER.PA1.S.S.AE.N.D.W.A.CH.PA1.PA1.
P.L.E.E.Z.Z.STOP.
LOAD THE PHRASE called: "THANKS with phonemes:
"D.THV.AE.NG.K.Z.STOP.
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
MOVE DISTANCE FORWARD for this many feet: 10
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 15
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 3
SPEAK the phrase called: "HUNGRY
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
WAIT this many seconds 240
SPEAK the phrase called: "THANKS
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 80
SPIN CLOCKWISE this many degrees: 180
MOVE DISTANCE FORWARD for this many feet: 3
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 15
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 10
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 30
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 50
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
JUMP to the line called "S
Q
```

NOTE: The robot says these phrases in the following order:
1. I want a peanut butter sandwich, please.
2. Thanks.

ACTIVITY 4: ROBOT VAUDEVILLE

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "HALLOWEEN with phonemes:
```

```
"H.H.AE.P.Y.PA1.H.AE.L.OO.W.Y.Y.N.STOP.
LOAD THE PHRASE called: "GHOST with phonemes:
"AH.E.E.PA1.AE.AE.M.PA1.AH1.AH2.PA1.F.R.EH.N.D.L.L.Y.PA1.
G.UH3.OO.S.T.STOP.
LOAD THE PHRASE called: "BOO with phonemes:
"B.UH1.UH1.UH1.UH1.STOP.
LOAD THE PHRASE called: "GOES with phonemes:
"H.H.U1.U1.U1.PA1.G.O1.O1.Z.PA1.D.THV.EH.R.STOP.
LOAD THE PHRASE called: "SCARY with phonemes:
"E.U1.U1.PA1.L.L.OO1.OO1.K.PA1.S.K.EH.R.Y.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF SONAR distance value is less than 200
EXIT IF ANY BUMPER TOUCHED
SPEAK the phrase called: "HALLOWEEN
WAIT this many seconds 2
REPEAT THIS LOOP
SPEAK the phrase called: "GHOST
SPEAK the phrase called: "BOO
STEP1
BEGIN A LOOP
EXIT IF SONAR distance value is less than 150
EXIT IF ANY BUMPER TOUCHED
SPEAK the phrase called: "GOES
REPEAT THIS LOOP
THINKING
SPEAK the phrase called: "SCARY
WAIT this many seconds 3
JUMP to the line called "S
Q
```

NOTE: The robot says these phrases in the following order:

1. Happy Halloween.
2. I am a friendly ghost.
3. Booo.
4. Who goes there?
5. You look scary.

ACTIVITY 5: THE ROBOT PROFESSOR

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "INTRO with phonemes:
"H.H.EH.L.L.OO.O1.PA1.AH.E.E.PA1.AE.AE.M.PA1.
AH1.AH1.R.PA0.B.Y.Y.PA1.F.AH.Y.V.PA1.D.THV.U.
```

```
PA1.I.N.T.EH.L.L.UH3.D.J.EH3.N.T.PA1.R.01.B.
AH1.T.STOP.
LOAD THE PHRASE called: "INTRO1 with phonemes:
"AH.E.E.PA1.K.AE.AE.N.PA1.M.U1.U1.V.STOP.
LOAD THE PHRASE called: "INTRO2 with phonemes:
"AH.E.E.PA1.K.AE.AE.N.PA1.T.AW1.AW1.K.STOP.
LOAD THE PHRASE called: "INTRO3 with phonemes:
"AH.E.E.PA1.L.L.AH1.E.K.PA1.T.U1.U1.PA1.H.EH.
L.P.PA1.M.AH.Y.PA1.F.R.EH2.N.DT.Z.Z.STOP.
LOAD THE PHRASE called: "REMIND1 with phonemes:
"P.OO1.OO1.T.PA1.AH.U1.T.PA1.D.THV.U.PA1.K.AE.T.
STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
SPEAK the phrase called: "INTRO
CIRCLE
SPEAK the phrase called: "INTRO1
WALTZ
SPEAK the phrase called: "INTRO2
SPEAK the phrase called: "REMIND1
WAIT this many seconds 1
SPEAK the phrase called: "INTRO3
THINKING
WAVE
JUMP to the line called "S
Q
```

ACTIVITY 6: ROBOT ZOO

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "TRUMPET with phonemes:
"O1.O1.NG.NG.NG.NG.K.STOP.
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 180
CALL this robot task line "ELEPHANT
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 45
SPEAK the phrase called: "TRUMPET
SPEAK the phrase called: "TRUMPET
MOVE DISTANCE FORWARD for ths many feet 1
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): DOWN
for this many degrees 90
```

```
SPIN CLOCKWISE this many degrees: 30
SPIN COUNTERCLOCKWISE this many degrees: 60
SPIN CLOCKWISE this many degrees: 30
MOVE DISTANCE BACKWARD for this many feet: .5
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 45
WAIT this many seconds 3
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 1
MOVE THE FOREARM (IN,OUT): IN for this many degrees 180
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
REPEAT THIS LOOP
JUMP to the line called "ELEPHANT
Q
```

NOTE: The robot is imitating a trumpeting elephant.

ACTIVITY 7: ROBOT BUTLER

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "COATS with phonemes:
"M.EH2.Y.PA1.AH.E.E.PA1.T.EH2.E.K.PA1.E.O.O.R.PA1.
K.O1.O1.T.Z.STOP.
LOAD THE PHRASE called: "THANKS with phonemes:
"D.THV.AE.NG.K.S.STOP.
CALL this robot task line "S
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): OUT for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 5
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
REPEAT THIS LOOP
MOVE DISTANCE FORWARD for this many feet: 9
SPEAK the phrase called: "COATS
WAIT this many seconds 10
SPEAK the phrase called: "THANKS
SPIN CLOCKWISE this many degrees: 180
```

```
MOVE DISTANCE FORWARD for this many feet: 10
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 10
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): IN for
this many degrees 90
MOVE THE FOREARM (IN,OUT): OUT for this many degrees 90
SPIN CLOCKWISE this many degrees: 270
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
MOVE THE ARM FROM SHOULDER (UP,DOWN,IN,OUT): UP for
this many degrees 90
MOVE DISTANCE FORWARD for this many feet: 10
SPIN CLOCKWISE this many degrees: 90
JUMP to the line called "S
Q
```

NOTE: The robot says these phrases in the following order:
1. May I take your coats?
2. Thanks.

ACTIVITY 8: ROBOT HOST

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "HOST with phonemes:
"H.H.EH.L.L.O1.PA1.W.AH1.AH1.T.PA1.H.H.AE1.AE.
V.PA1.E.U1.U1.PA1.B.EH1.EH3.N.PA1.D.U1.U1.I1.N.
NG.PA1.T.U1.U1.D.A1.I3.Y.STOP.
LOAD THE PHRASE called: "HOST1 with phonemes:
"D.THV.AE.T.PA1.S.S.S.AH1.OO.N.DT.Z.Z.PA1.L.L.
AH1.E.K.PA1.F.UH1.UH1.N.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
RPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
MOVE FORWARD
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
EXIT IF SONAR distance value is less than 95
REPEAT THIS LOOP
STOP ALL MOTION
SPEAK the phrase called: "HOST
SPIN CLOCKWISE tis many degrees: 20
SPEAK the phrase called: "HOST1
```

```
PICK A RANDOM DIRECTION
MOVE FORWARD
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
EXIT IF SONAR distance value is less than 95
TURN OFF THE FLASHING LIGHTS
REPEAT THIS LOOP
JUMP to the line called "S
Q
```

ACTIVITY 9: RB5X SAYS

```
PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "RB5X SAYS with phonemes:
"AH1.AH1.R.PA0.B.Y.Y.PA1.F.AH.Y.V.PA1.EH.K.S.PA1.
S.EH2.Z.STOP.
LOAD THE PHRASE called: "ATTENTION with phonemes:
"P.EH2.Y.PA1.AH.T.EH.N.CH.UH.N.STOP.
LOAD THE PHRASE called: "SAY THAT with phonemes:
"D.I.D.PA1.AH.E.E.PA1.S.EH2.Y.PA1.D.THV.AE.T.STOP.
LOAD THE PHRASE called: "FACE FRONT with phonemes:
"F.EH2.E.S.PA1.F.R.UH2.N.T.STOP.
LOAD THE PHRASE called: "FACE BACK with phonemes:
"F.EH2.E.S.PA1.B.AE.AE.K.STOP.
LOAD THE PHRASE called: "OPEN HAND with phonemes:
"O1.O1.P.UH1.N.PA1.E.O.O.R.PA1.H.AE.N.D.STOP.
LOAD THE PHRASE called: "CLOSE HAND with phonemes:
"K.L.O1.Z.PA1.E.O.O.R.PA1.H.AE.N.D.STOP.
LOAD THE PHRASE called: "WIGGLE WRIST with phonemes:
"W.A.G.L.PA1.E.O.O.R.PA1.W.ER.I.Z.T.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
TURN ON THE FLASHING LIGHTS
SPEAK the phrase called: "RB5X SAYS
SPEAK the phrase called: "FACE BACK
SPIN CLOCKWISE this many degrees: 180
SPEAK the phrase called: "FACE FRONT
SPEAK the phrase called: "SAY THAT
SPEAK the phrase called: "RB5X SAYS
SPEAK the phrase called: "FACE FRONT
SPIN COUNTERCLOCKWISE this many degrees: 180
SPEAK the phrase called: "RB5X SAYS
SPEAK the phrase called: "WIGGLE WRIST
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WRIST WIGGLING
SPEAK the phrase called: "ATTENTION
SPEAK the phrase called: "RB5X SAYS
SPEAK the phrase called: "OPEN HAND
MOVE THE HAND (OPEN,CLOSE): OPEN for this (1-100) %: 100
SPEAK the phrase called: "CLOSE HAND
SPEAK the phrase called: "SAY THAT
SPEAK the phrase called: "RB5X SAYS
SPEAK the phrase called: "CLOSE HAND
MOVE THE HAND (OPEN,CLOSE): CLOSE for this (1-100) %: 100
MOVE THE FOREARM (IN,OUT): IN for this many degrees 90
JUMP to the line called "S
Q
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NOTE: The robot says these phrases:

1. RB5X says:
2. Pay attention.
3. Did I say that?
4. Face front.
5. Face back.
6. Open your hand.
7. Close your hand.
8. Wiggle your wrist.

ACTIVITY 10: MULTIPURPOSE ROBOT

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PREPARE THE ROBOT
PREPARE THE VOICE
LOAD THE PHRASE called: "HELLO with phonemes:
"H.H.EH.L.L.O1.PA1.W.AH1.AH1.T.PA1.H.H.AE1.AE.V.
PA1.E.U1.U1.PA1.B.EH1.EH3.N.PA1.D.U1.U1.I1.N.NG.
PA1.T.U1.U1.D.A1.I3.Y.STOP.
CALL this robot task line "S
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 1
SPEAK the phrase called: "HELLO
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 2
SQUAREX
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 3
THINKING
REPEAT THIS LOOP
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BEGIN A LOOP
EXIT IF THIS BUMPER is touched 4
ANIMAL CHARADES
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 5
WAVE
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 6
MUSIC PATTERN
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 7
WALTZ
REPEAT THIS LOOP
BEGIN A LOOP
EXIT IF THIS BUMPER is touched 8
JUMP to the line called "S
REPEAT THIS LOOP
Q
```