APPENDIX 1

ROBOT VOCABULARY

The following is a complete list of the robot vocabulary used in the activities contained here. The commands are listed in order of their appearance in this book.

PREPARE THE ROBOT
WAIT
CALL
JUMP
BUILD AND LOAD
BEGIN A LOOP
REPEAT THIS LOOP
MOVE RANDOMLY
MOVE TIMED FORWARD
MOVE TIMED BACKWARD
PIVOT ON LEFT CLOCKWISE
PIVOT ON LEFT COUNTERCLOCKWISE
PIVOT ON RIGHT CLOCKWISE
PIVOT ON RIGHT COUNTERCLOCKWISE
STOP ALL MOTION
MOVE DISTANCE BACKWARD
MOVE DISTANCE FORWARD
SPIN CLOCKWISE
SPIN COUNTERCLOCKWISE

```
SPIN LEFT 90 DEGREES
SPIN RIGHT 90 DEGREES
BEGIN A COUNTED LOOP
REPEAT THIS COUNTED LOOP
PICK A RANDOM DIRECTION
WAIT RANDOMLY
MOVE BACKWARD
MOVE FORWARD
SPIN AROUND CLOCKWISE
SPIN AROUND COUNTERCLOCKWISE
EXIT IF ANY BUMPER TOUCHED
EXIT IF FRONT+REAR BUMPER PRESS
EXIT IF THIS BUMPER
EXIT IF SONAR
TURN ON INFRARED LED
TURN OFF INFRARED LED
EXIT IF TAPE IS SENSED
FOLLOW TAPE
MOVE FORWARD TIL TAPE NOT SENSED
EXIT IF BATTERY IS LOW
EXIT IF CHARGER IS TOUCHED
MAINTAIN CHARGE
X CHARGER FINDER
TURN ON THE HORN
TURN OFF THE HORN
HONK
TURN ON THE FLASHING LIGHTS
TURN OFF THE FLASHING LIGHTS
TURN ON LED
TURN OFF LED
PREPARE THE VOICE
LOAD THE PHRASE
SPEAK
MOVE THE ARM FROM THE SHOULDER
MOVE THE FOREARM
TURN THE WRIST
MOVE THE HAND
```

APPENDIX 2

PHONEMES

OVERVIEW

The following is a list of the phonemes you use to program speech for RB5X.

STOP
Use after each finished phrase.

PA0
Use to double letter sounds, for inflection or emphasis.

PA1
Use after each word to create a short pause; more PA1s create longer pauses.

A
As in _i_s or lim_i_t (longest of A group).

A1
As in h_i_ccup.

A2
As in b_i_t (single) or m_i_tten (shortest of a group).

AE
As in at.

AE1
As in animal or and.

AH
As in arise or alarm.

AH1
As in a dog, similar to father but not quite the same.

AH2
As in hot (several), single is short. Use in combination for complex vowel sounds, as in vowel.

AW
As in father or abuelo.

AW1
As in hawk or haul.

AW2
As in harbor or aardvark. The A sound before R.

AY
As in inside (several) or it (single).

E
As in seem (several) or eat (single).

E1
As in eliminate (several) or seat (single).

EH
As in elevator (single).

EH1
As in wretched (several) or wretched (single).

EH2
As in esta (several) or chile (single).

EH3
As in went (several) or intelligent (single).

I
As in integral (several) or hit (single).

I1
As in limit (single).

I2
As in nip (single) or ear and irregular (several).

I3
As in which (several) or ditch (single).

IU
As in what (several) or ink (single).

O
As in orange (several) or carrot (single).

O1
As in cooperative (several) or doubt (single).

O2
As in onion (several) or honey (single).

OO
As in robot (several) or robot (single).

OO1
As in como (several) or como (single).

U
As in look (several) or useful (single).

U1
With a long E sound in front, useful (several) or other (single).

UH
As in unless (several) or what (single).

UH1
As in gum (several) or up (single).

UH2
Very short sound for emphasis or as in a.

UH3
Use as a short sound in combination with other vowels.

Y
As in seat (several) or ready (single).

Y1
As in teepee (several) or wheat (single).

B
As in boy (single).

CH
As in chew (several) or church (single).

D
As in ditch (single); very short and soft.

DT
As in dentist (single) and other DE combinations.

ER
As in stir or dinner (single).

F
As in first (several) or after (single).

G
Sounds like IK or like program (single).

H
As in help (several) or ahum (single).

J
As in tsh (several) or ts (single); use with D for gent.

K
As in cat, quiet, and take (single).

L
As in trouble (single) or like (several).

M
For all M sounds, correct vowel sounds important.

N
As in name (several) or sound (single).

NG
As in song (several) or angle (single).

P
As in put (single).

R
As in run (single).

S
As in hiss (several) or its (single).

SH
As in shovel (several) or sheep (single).

T
As in cat (single).

TH
As in through (several) or sheath (single).

THV
As in seventh (several or this (single); must use carefully, not a good sound.

V
As in very (several) or voice (single).

W
As in forward (several) or went (single).

Z
As in snake (several) or tallest (single).

ZH
As in buzz (several) or atchoo (single).

APPENDIX 3

SAMPLE SOLUTIONS

OVERVIEW

As we mentioned in "A Foreword to the Teacher," the solutions in this appendix are merely suggestions. There are many different ways to answer the questions posed by the activities in this book, and students should be encouraged to use their imaginations to develop their own.

SECTION A: ROBOT MOVEMENT

ACTIVITY 1:
RANDOM MOVEMENT VS. STRUCTURED MOVEMENT

```
PREPARE THE ROBOT
CALL this robot task line "S
MOVE TIMED FORWARD for this many seconds: 2
PIVOT ON LEFT CLOCKWISE
WAIT this many seconds: .5
PIVOT ON LEFT COUNTERCLOCKWISE
```

```
WAIT this many seconds: .5
PIVOT ON LEFT CLOCKWISE
WAIT this many seconds: .5
MOVE TIMED BACKWARD for this many seconds: 2
STOP ALL MOTION
WAIT this many seconds: 2
JUMP to the line called "S
Q
```

ACTIVITY 2: MOVE IN A SQUARE

```
PREPARE THE ROBOT
CALL this robot task line "S
MOVE DISTANCE FORWARD for this many feet: 3
SPIN LEFT 90 DEGREES
MOVE DISTANCE FORWARD for this many feet: 3
SPIN LEFT 90 DEGREES
MOVE DISTANCE FORWARD for this many feet: 3
SPIN LEFT 90 DEGREES
MOVE DISTANCE FORWARD for this many feet: 3
SPIN LEFT 90 DEGREES
JUMP to the line called "S
Q
```

ACTIVITY 3: MOVE IN A TRIANGLE

```
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
SPIN CLOCKWISE this many degrees: 120
MOVE DISTANCE FORWARD for this many feet: 2
SPIN CLOCKWISE this many degrees: 120
MOVE DISTANCE FORWARD for this many feet: 2
SPIN CLOCKWISE this many degrees: 120
JUMP to the line called "S
Q
```

ACTIVITY 4: MOVE IN A CIRCLE

```
PREPARE THE ROBOT
CALL this robot task line "S
```

```
BEGIN A COUNTED LOOP called "CIRCLE beginning at 1 ending
at 20
ARC
REPEAT THIS COUNTED LOOP for the counter 20
WAIT this many seconds: 5
JUMP to the line called "S
Q
```

```
ARC

MOVE DISTANCE FORWARD for this many feet: 2
SPIN CLOCKWISE this many degrees: 18
Q
```

ACTIVITY 5: ROBOT PATHFINDER

Let's Experiment

```
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: 5
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 8
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 3.5
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 8
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 line called "S
Q
```

Let's Experiment Some More

Add the following before JUMP:

```
WAIT for this many seconds: 5
SPIN CLOCKWISE this many degrees: 90
```

```
MOVE DISTANCE FORWARD for this many feet: 2
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 8
SPIN CLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 3.5
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 8
SPIN COUNTERCLOCKWISE this many degrees: 90
MOVE DISTANCE FORWARD for this many feet: 5
SPIN CLOCKWISE this many degrees: 180
```

ACTIVITY 6: ANIMAL CHARADES

Let's Experiment

A Duck Looking for Food

```
PREPARE THE ROBOT
CALL this robot task line "S
BEGIN A LOOP
EXIT IF ANY BUMPER TOUCHED
REPEAT THIS LOOP
PICK A RANDOM DIRECTION
MOVE TIMED FORWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 10
MOVE TIMED FORWARD this many seconds: .2
SPIN COUNTERCLOCKWISE this many degrees: 20
MOVE TIMED FORWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 20
MOVE TIMED FORWARD this many seconds: .2
WIAT for this many seconds: .4
PICK A RANDOM DIRECTION
SPIN COUNTERCLOCKWISE this many degrees: 180
MOVE TIMED FORWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 20
MOVE TIMED FORWARD this many seconds: .2
SPIN COUNTERCLOCKWISE this many degrees: 20
MOVE TIMED FORWARD this many seconds: .2
SPIN CLOCKWISE this many degrees: 20
MOVE TIMED FORWARD this many seconds: .2
SPIN COUNTERCLOCKWISE this many degrees: 190
JUMP to the line called "S
Q
```