SECTION D

SPEECH PROGRAMMING

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

RB5X can say anything you would like it to. The trick is to think exactly how you say the same words. What we write on paper is not really what we say. Think of a simple short word like "I," "my," or "have." Say the word out loud. Listen to how many different sounds the word actually

has. "I" has two sounds (i-ee), "my" has three sounds (M-i-ee), and "have" has four sounds (h-a-u-v). The sounds are different from the spelling.

To make RB5X understandable, you have to teach it all of the sounds, or phonemes, in the right order for each word. A phoneme is the smallest, single, utterable speech sound. RB5X uses 61 phonemes, two kinds of pauses, and one very important command, STOP. As you enter a phoneme into the voice program, follow it by a period to tell the robot where each phoneme ends. For example: "I" = AH.E.E.STOP., "my" = M.AH.Y.STOP., "have" = H.H.AE1.AE.V.STOP. If we want RB5X to say "I have," we would enter the phonemes like this: AH.E.E.PA1.H.H.AE1.AE.V.STOP. PA1 is the pause between words. With practice, you will learn how to have RB5X say what you want with ease.

New Robot Vocabulary

1. PREPARE THE VOICE
2. LOAD THE PHRASE called "_____ with the phonemes "_____
3. SPEAK the phrase called "_____

Let's Experiment

Decide on a word you would like RB5X to say. Pick something different from the words given in the explanation. Think about each sound in the word. To select the right phonemes, study the phoneme list at the back of this section and in the section called Appendix 2 at the back of this book. Now that you have the phonemes selected, DEFINE a new task using the new vocabulary. You must use the new robot vocabulary in the order shown above.

At first, you probably want RB5X to say the word over and over so you can decide if it sounds right. Use any of the techniques you have learned to do this. How does your word sound? How could you fix it to sound better?

Let's Experiment Some More

Now that you see how to develop speech for the robot, think of a few more words you would like RB5X to say. Work out the phonemes. Add these words to your previous task. Make notes of the phonemes used for each word.

ACTIVITY 2: REPEATING A SIMPLE SENTENCE

You can see that RB5X has no trouble saying things once you figure out how to enter the phonemes. Why not have RB5X repeat a simple sentence every time it is told to?

Let's Experiment

Decide on a sentence you would like RB5X to be able to say over and over. Work out the phonemes for each word. Remember that when you enter a whole sentence into LOAD THE PHRASE, you should use PAls between each word to make the speech easier to understand. Remember the programming technique that will make RB5X wait to be told to perform. Now DEFINE a new task and enter your program. How does it work?

Let's Experiment Some More

How could you take the same sentence and make it sound different? You could use PAls to change the rate at which the robot says the sentence or you could change the phonemes to put more or less emphasis on certain words. Try to make the sentence in the previous task sound different. Experiment to find out which you like best.

ACTIVITY 3: A ROBOT INTRODUCTION

Let's put RB5X to work. Why not have the robot explain to your friends what it can do instead of your having to do it. All RB5X needs is more vocabulary.

Let's Experiment

Decide what you want the robot to be able to tell your friends about itself. Write out the script and pick the phonemes you need for each word. Decide if you want to

load all of the phonemes in one phrase or if you would rather use separate, shorter phrases. (One of these methods is easier than the other for correcting any mistakes in the phonemes.) Also, decide if you want RB5X to give the introduction on command or on its own.

Now DEFINE a task and enter your program. When you are happy with the way the robot sounds, try it out on your friends.

Let's Experiment Some More

Now that you have all of the phonemes for the introduction, let's have the robot take on a new personality. Instead of giving all of the information at once, have RB5X wait for a prompt from you for each part of the introduction. If you loaded the sentences into separate phrases, you are all ready. If not, you want to do this first.

EDIT the previous task and, using the LOOP command, arrange the task so RB5X only says the next sentence when you press a bumper. Does this give RB5X a different personality?

ACTIVITY 4: DELIVER AN IMPORTANT MESSAGE

Since RB5X can give such a good introduction of itself, certainly it can perform other useful jobs. Why couldn't RB5X deliver an important message to someone?

Let's Experiment

Think of an important message that you would like to send to someone. Also think of a way that the robot can let someone know that it has an important message to deliver. Select the vocabulary and the proper phonemes for both. DEFINE a new task that lets RB5X alert someone and then deliver the message on command. At this point, you may have to pretend that you know where the person is who is to receive the message. Write your task and see if it works.

Let's Experiment Some More

Now that RB5X can deliver the message, how could the robot let you know that the message has been delivered? This takes some careful thinking. You need commands from the previous activities. There are many ways to do this. Let your imagination be your guide. What is going to tell you that someone has received the message?

ACTIVITY 5: THE ROBOT REMINDER

If RB5X can deliver an important message, surely it can also serve as a daily reminder of jobs that need to be done. What a nice way to help you remember because you know that RB5X will never get mad at you!

Let's Experiment

Think of some jobs that you have to do today or jobs that you have to do regularly, but sometimes forget to do. Make a list of these. Decide how you want the robot to remind you of each. Write a script and pick out the correct phonemes for each word.

DEFINE a task and enter your program. Try it out. When you are satisfied with it, use it for a while to see if it helps to have a robot reminder.

Let's Experiment Some More

Sometimes we know what we have to do, but we get sidetracked doing the least important jobs first and then running out of time for the more important jobs. Organize your jobs by order of importance.

You can either EDIT the previous task or DEFINE a new one. Write your program so the robot reminds you of only one thing at a time and waits to remind you of the next until you ask.

ACTIVITY 6: THE ALIEN ROBOT

RB5X can really say anything at all. Not only can the robot learn to speak English, but RB5X can speak foreign languages or a language of your invention. All you need to do is to select the proper sounds.

Let's Experiment

Select a phrase in a language other than English. You may know some yourself, or you can find one in a book or on a tape. All you need to know is how it sounds. Pick the phonemes that you think will come closest to sounding like the words in the phrase.

DEFINE a new task or EDIT your repeating-sentence task and program in the phonemes. How does RB5X sound? Would the robot pass for a visitor from another country?

Let's Experiment Some More

It would be fun to have a code language that only you and your robot can understand. You can invent your own words and give them meanings or you can use something like "Pig-Latin."

If you invent your own, write a dictionary as you go so you won't forget what RB5X means when it speaks to you. You can save these words and phrases to be used in future robot tasks if you like. How easily can you understand what RB5X says? Can anyone else figure out your "robot language"?

ACTIVITY 7: ROBOT INSTRUCTIONS

RB5X can use its speech for some very helpful jobs. Suppose you know how to do something that you need to teach to someone else, but you can't be there when the other person needs the information. Have RB5X do it.

Let's Experiment

First decide on the task to be done. Just as an example, let's have RB5X teach someone how to make a good sandwich. What are all of the steps involved in making a sandwich? Besides the actual making of the sandwich, do you need to tell someone where to find the ingredients or do they already know? Should you have RB5X wait after each instruction, should the robot give all of the information at once, or should the "student" ask RB5X for each step when ready? These are all things you need to decide before you write the program.

List all of the steps on a piece of paper. Check to see that you have included all the important points. Select the proper phonemes and write your program. Once you think it sounds right, try to follow the instructions yourself. If you think you need to change anything, do so and then let someone else try to follow the instructions.

ACTIVITY 8: A CONVERSATION WITH YOUR ROBOT

You can see that RB5X's speech abilities are useful for many different situations. The robot can explain, deliver messages, speak foreign languages, and give directions. Now how about sitting down and having a friendly conversation with someone?

Let's Experiment

It is time to have RB5X use its social nature. Robots can be very friendly. Your job is to select the right phrases to let RB5X show your friends just what good companions robots can be.

First you need to decide who should take the lead in the conversation. It will probably work best if the robot does, but this is up to you. Then decide exactly what the robot is going to say and select the phonemes you need.

Once this part is done, you need to decide if the robot is going to just WAIT a given amount of time before saying the next phrase or is going to need a prompt to say the next sentence. When you have all of this under control, you are ready to DEFINE a new task and to enter your program.

Try out the conversation. How realistic does it sound? Have other people try holding a conversation with RB5X.

ACTIVITY 9: A PLAY FOR ROBOT AND TWO ACTORS

If RB5X can have a conversation with you and your friends, certainly the robot can take part in a play. What character would suit RB5X best? Will the robot need a costume? Should the setting be in the past, the present, or the future? Do you want to write the script yourself or to use a prepared script? How long should the play be?

Let's Experiment

Once you have answered the questions above, you are ready to continue. Select the speaking parts for RB5X. Pick the phonemes for all that the robot says. Decide when and how the robot should move. DEFINE a new task. LOAD THE PHRASEs with the correct phonemes.

Now that you are ready to write the main part of your task, decide if you want someone to prompt RB5X for each line or if you want to time the conversation by the other actors and just tell RB5X how long to WAIT before it says each line.

Once your task is written, rehearse the play. When you are satisfied with everyone's performance, invite some friends to attend the premier.

ACTIVITY 10: THE ROBOT PSYCHOLOGIST

RB5X can really do a great many different tasks. Why not have the robot act as a friendly psychologist, willing to listen to what's been bothering you for a while, eager to be a friend.

Let's Experiment

Computers have acted as psychologists for a while now. There are several programs for microcomputers that could

give you ideas for the kinds of things you might want RB5X to say in response to your problems. You can also write your own.

Think of people you know who are considered "good listeners." What do they say to keep someone else talking? Write your script and DEFINE a new task. LOAD THE PHRASEs with the correct phonemes for each sentence. Now, decide if you want to prompt RB5X for each sentence or if you want a timed WAIT. Write your program and try it out. When RB5X performs to your satisfaction, let others share the benefits of RB5X's soothing nature.

PHONEMES

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 is or limit (longest of A group).

A1
As in hiccup.

A2
As in bit (single) or mitten (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 (sngle) 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).