

# NORTH CAROLINA STATE UNIVERSITY | AT RALEIGH

SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

DEPARTMENT OF COMPUTER SCIENCE  
P. O. Box 5972  
RALEIGH, N. C. 27607

April 18, 1978

Douglas A. Lyon  
125 Startton Rd  
New Rochelle, N.Y. 10804

Dear Douglas,

It gives me great pleasure to inform you that your application for the Student Science Training Program in Computers and Computing at North Carolina State University was approved by the Selection Committee.

We sincerely hope that you will be able to accept this invitation. We request that you sign and return the enclosed letter with your decision indicated. The information must be postmarked not later than May 1, 1978.

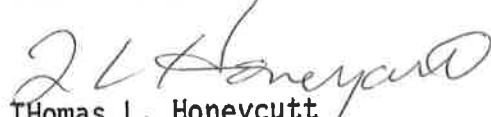
It is understood that acceptance obligates you to:

- a. Attend for the full duration of the project (July 5 - August 10, 1978) without taking time out for any other activity.
- b. Promptly decline any subsequent offers as a participant in another SSTP.

Upon receipt of your acceptance, further information will be forwarded to you by June 1, 1978.

We are looking forward to hearing from you and hope you will be with us this summer.

Sincerely yours,

  
THOMAS L. Honeycutt  
NSF SSTP Computers and Computing

TLH:bah  
Enclosure

P.S. You have been awarded financial aid in the amount of \$ .00.

AI CYBERNETIC VOICE SYNTHESIZER PROJECT II  
 NSF-SSTP SUMMER SIMULATION PROJECT  
 RUSSELL BARNES                      DOUGLAS LYON

THE AI MODEL 1000 SPEECH SYNTHESIZER WAS INTERFACED WITH AN IMSAI 8080 MICROCOMPUTER SYSTEM TO SIMULATE THE HUMAN VOCAL TRACT. THE WORDS ARE SYNTHESIZED FROM THE BASIC PHONETIC UNITS OF SPEECH ASSOCIATED WITH THE AMERICAN ENGLISH LANGUAGE. ALTHOUGH ITS SPEECH IS NOT AS INTELLIGIBLE AS DIGITALIZED SPEECH, THE MODEL 1000 IS NOT LIMITED BY PRERECORDED SPEECH.

THE AI MODEL 1000 SPEECH SYNTHESIZER WAS ORIGINALLY ADJUSTED TO CONVERT THE ASCII EQUIVALENTS OF ENGLISH LETTERS TO THEIR CORRESPONDING SOUNDS. HOWEVER, CHANGES IN THESE SYMBOLS WERE REQUIRED TO PRODUCE MAXIMUM INTELLIGIBLE SPEECH.

IF THE IMSAI IS LOADED WITH THE FOLLOWING CODE, DIFFERENT SOUNDS CAN BE PRODUCED TO DISCOVER THE DIFFERENT PHONEMES. THE DATA IS ENTERED THROUGH THE PROGRAMMED INPUT SWITCHES ON THE FRONT PANEL OF THE IMSAI.

000	333	INP	INPUT DATA FROM
001	377		PORT 255 (377 <sub>8</sub> )
			PROGRAMMED INPUTS
002	323	OUT	OUTPUT DATA TO
003	376		PORT 254 (376 <sub>8</sub> )
			MODEL 1000
004	303	JMP	UNCONDITIONAL JUMP TO
005	000		000 (L0)
006	000		000 (HI)

THE FOLLOWING CODE ALLOWS THE USER TO OUTPUT A CHAIN OF PHONEMES TO PORT 377<sub>8</sub>. THE PHONEMES ARE THROWN OUT AT A RELATIVELY LARGE TIME INTERVAL, SINCE THE CAPACITORS REQUIRE TIME TO DISCHARGE WHEN COMPLETING EACH PHONEME. THERE IS ALSO A TIMING LOOP TO SLOW THE SPEECH TO AN INTELLIGIBLE LEVEL.

THE DATA BEGINS AT 007 000<sub>8</sub> AND MUST END WITH A 007<sub>8</sub> CONTROL CHARACTER TO SIGNIFY THE END OF THE DATA TO THE PROGRAM. A SPACE CHARACTER IS ALSO INSERTED AFTER THE LAST PHONEME AND BEFORE THE CONTROL CHARACTER TO CAUSE THE SYNTHESIZER TO OUTPUT A PAUSE BEFORE IT IS ENDED. THIS KEEPS THE SYNTHESIZER FROM SOUNDING THE LAST PHONEME CONTINUOUSLY WHILE THE PROGRAM IS IN THE RUN/ HALT STATE.

000	041	LXI H	LOAD FIRST DATA ADDRESS
001	000		INTØ H REGISTER PAIR
002	007		
003	333	IN	INPUT
004	376		MØDEL 1000 STATUS
005	346	ANI	MASK
006	001		AND TRY AGAIN
007	312	JZ	IF BUSY
010	003		
011	000		
012	346	ANI	CLEAR ACCUMULATØR
013	000		
014	305	ADI	SET UP DELAY LØØP
015	024		FØR 20 <sub>10</sub> TIMES
016	326	SUI	
017	001		
020	302	JNZ	
021	015		
022	000		
023	176	MØV A,M	LOAD DATA INTØ ACCUMULATØR
024	326	SUI	CHECK FØR CØNTRØL
025	007		CHARACTER (007 <sub>8</sub> )
026	312	JZ	
027	267		
030	000		
031	306	ADI	RESTØRE ACCUMULATØR WITH
032	007		ØRIGINAL DATA
033	323	ØUT	ØUTPUT DATA TØ MØDEL 1000
034	376		
035	043	INX H	INCREMENT DATA ADDRESS
036	001	LXI B	TIMING LØØP BEGINS
037	377		
040	377		
041	062	STA	
042	277		
043	000		
044	021	LXI D	
045	377		
046	377		
047	326	SUI	
050	001		
051	312	JZ	
052	057		
053	000		
054	303	JMP	
055	047		
056	000		
057	072	LDA	
060	277		
061	000		

062	326	SUI	
063	001		
064	312	JZ	
065	003		
066	000		
067	303	JMP	JUMP OUT OF TIMING LOOP
070	041		
071	000		
267	166	HLT	STOP EXECUTION OF PROGRAM