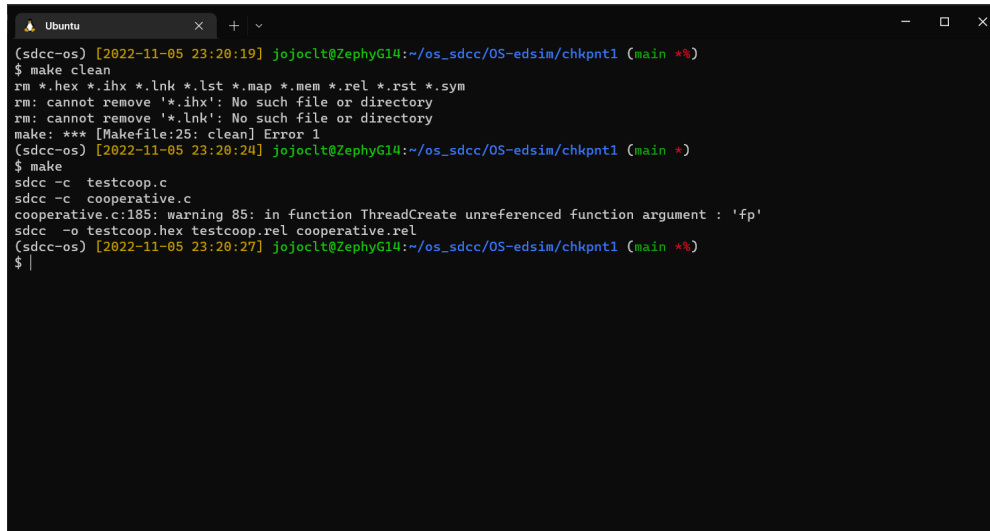


Programming Project Checkpoint#1

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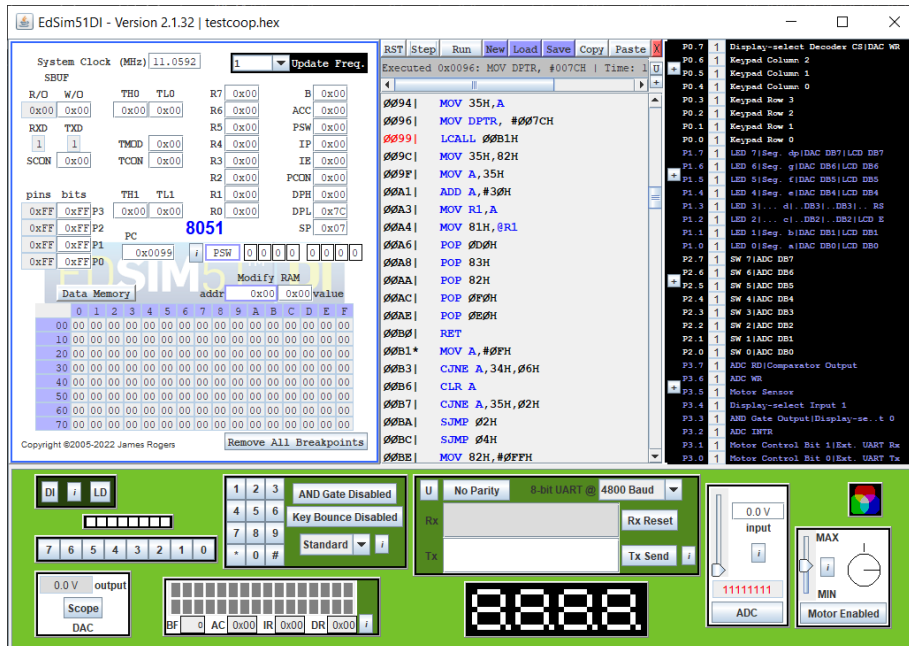
[1] Typescript for compilation

A terminal window titled 'Ubuntu' showing a series of commands and their outputs. The user is in a directory ~/os_sdcc/OS-edsim/chkpnt1. They run 'make clean', which fails with errors: 'rm: cannot remove '*.ihx': No such file or directory' and 'rm: cannot remove '*.lnk': No such file or directory'. Then they run 'make', which succeeds. Next, they run 'sdcc -c testcoop.c', which produces a warning in cooperative.c and creates cooperative.rel. Finally, they run 'sdcc -o testcoop.hex testcoop.rel cooperative.rel', which successfully creates testcoop.hex.

```
(sdcc-os) [2022-11-05 23:20:19] jojoelt@ZephyG14:~/os_sdcc/OS-edsim/chkpnt1 (main *)  
$ make clean  
rm *.hex *.ihx *.lnk *.lst *.map *.mem *.rel *.rst *.sym  
rm: cannot remove '*.ihx': No such file or directory  
rm: cannot remove '*.lnk': No such file or directory  
make: *** [Makefile:25: clean] Error 1  
(sdcc-os) [2022-11-05 23:20:24] jojoelt@ZephyG14:~/os_sdcc/OS-edsim/chkpnt1 (main *)  
$ make  
sdcc -c testcoop.c  
sdcc -c cooperative.c  
cooperative.c:185: warning 85: in function ThreadCreate unreferenced function argument : 'fp'  
sdcc -o testcoop.hex testcoop.rel cooperative.rel  
(sdcc-os) [2022-11-05 23:20:27] jojoelt@ZephyG14:~/os_sdcc/OS-edsim/chkpnt1 (main *)  
$ |
```

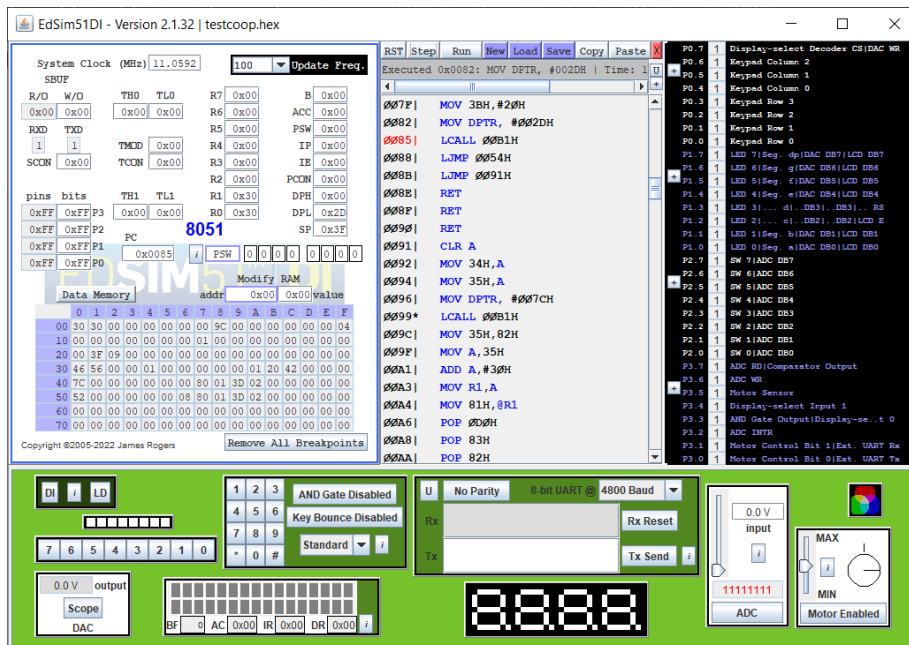
[2] Screenshots and explanation

Before Each ThreadCreate Call



- ThreadCreate(main)

When performing LCALL, the DPTR with value 0x7C (Address of main) is pushed into the stack 2 bytes, resulting in change of SP from 0x07 to 0x09



- ThreadCreate(Producer)

When performing LCALL, the DPTR with value 0x2D (Address of Producer) is pushed into the stack 2 bytes, resulting in change of SP from 0x3F to 0x41

Producer running

The screenshot shows the EdSim51DI software interface. The System Clock is set to 11.0592 MHz. The PC register is at 8051. The Data Memory is at 0x3C. The Producer is running because the values SCON, TMOD are initialized for polling. The nextProduce will get change when the Producer is running.

System Clock (MHz): 11.0592 | 100 | Update Freq.

SBUP

R/O	W/O	TH0	TL0	R7	B
0x00	0x41	0x00	0x00	R6	0x00
0x00	0x00	0x00	0x00	R5	0x00
0x00	0x00	0x00	0x00	R4	0x00
0x00	0x00	0x00	0x00	R3	0x00
0x00	0x00	0x00	0x00	R2	0x00
0x00	0x00	0x00	0x00	R1	0x00
0x00	0x00	0x00	0x00	R0	0x00

pins bits

TH1	TL1
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00

PC: 8051

Modify RAM

Data Memory

addr: 0x00 | 0x00 | value

0 1 2 3 4 5 6 7 8 9 A B C D E F

00 30 31 00 00 00 20 00 02 02 00 00 00 00 00 00 42

10 34 30 00 00 00 00 04 00 00 00 00 00 00 00 00

20 01 4F 41 08 00 00 00 00 00 00 00 00 00 00 00

30 46 56 00 00 03 01 00 00 00 01 41 42 00 00 00

40 7A 00 01 00 01 00 01 80 01 3D 02 00 00 00 00

50 52 00 00 00 00 08 00 01 3D 02 00 00 00 00 00

60 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

70 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

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Remove All Breakpoints

Assembly Code:

```
00201 MOV DPTR, #0001H
00203 CLR A
00204 MOVX @DPTR, A
00205 INC DPTR
00206 DJNZ R0, 00FAH
00208 DJNZ R1, 00FAH
0020A LJMPL 0003H
0020D MOV 3CH, #41H
00301 MOV A, 3AH
00302 JZ 1BH
00304 MOV A, 3CH
00306 MOV R7, A
00307 INC A
00308 MOV 3CH, A
0030A MOV 3BH, R7
0030C MOV A, 3CH
0030E ADD A, #0A5H
00401 JNC 03H
00402 MOV 3CH, #41H
00405 MOV A, 3AH
00407 CJNE A, #01H, 00H
```

Hardware Interface:

- DI, LD, AND Gate Disabled, Key Bounce Disabled
- U: No Parity, 8-bit UART @ 4800 Baud, Rx Reset, Tx Send
- 5.0V output, Scope, DAC
- ADC: 0.0V input, 11111111, MAX, MIN, Motor Enabled

I know that Producer is running because at Data Memory 0x3C, the nextProduce will get change when the Producer is running

Consumer running

The screenshot shows the EdSim51DI software interface. The System Clock is set to 11.0592 MHz. The PC register is at 8051. The Data Memory is at 0x3C. The Consumer is running because the values SCON, TMOD are initialized for polling. The nextProduce will get change when the Producer is running.

System Clock (MHz): 11.0592 | 100 | Update Freq.

SBUP

R/O	W/O	TH0	TL0	R7	B
0x00	0x00	0x00	0x00	R6	0x00
0x00	0x00	0x00	0x00	R5	0x00
0x00	0x00	0x00	0x00	R4	0x00
0x00	0x00	0x00	0x00	R3	0x00
0x00	0x00	0x00	0x00	R2	0x00
0x00	0x00	0x00	0x00	R1	0x00
0x00	0x00	0x00	0x00	R0	0x00

pins bits

TH1	TL1
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00
0x00	0x00

PC: 8051

Modify RAM

Data Memory

addr: 0x00 | 0x00 | value

0 1 2 3 4 5 6 7 8 9 A B C D E F

00 31 30 00 00 00 00 01 00 5C 00 00 00 00 00 00 00

10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

20 01 4F 41 08 00 00 00 00 00 00 00 00 00 00 00

30 46 56 00 00 03 01 00 00 00 01 20 00 00 00 00

40 88 00 00 00 00 00 00 00 00 00 00 00 00 00 00

50 2D 00 00 00 00 00 08 00 00 00 00 00 00 00 00

60 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

70 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

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Remove All Breakpoints

Assembly Code:

```
00541 MOV 89H, #20H
00547 MOV 8DH, #0FAH
0055A MOV 98H, #50H
0055D SETB 8EH
0055F SETB 99H
00611 MOV A, 3AH
00613 JNZ 12H
00651 JNB 99H, 00FDH
00661 MOV 99H, 3BH
0066B CLR 99H
0066D MOV A, 3AH
0066F CJNE A, #01H, 00H
00721 CLR A
00731 RLC A
00741 MOV R7, A
00751 MOV 3AH, R7
00771 LCALL 015EH
007A1 SJMP 0B5H
007C1 MOV 3AH, #01H
007E1 MOV 3BH, #20H
00821 MOV DPTR, #002DH
```

Hardware Interface:

- DI, LD, AND Gate Disabled, Key Bounce Disabled
- U: No Parity, 8-bit UART @ 4800 Baud, Rx Reset, Tx Send
- 5.0V output, Scope, DAC
- ADC: 0.0V input, 11111111, MAX, MIN, Motor Enabled

I know that Consumer is running because the values SCON, TMOD are initialized for polling.