

### 3. [20 points] Typescript and screenshots

#### 3.1 [2 points] Typescript for compilation

Turn in a typescript showing compilation of your code using the provided [Makefile](#). You should use the following two commands (Note: `$` is the prompt displayed by the shell and is not part of the command that you type.) The first one deletes all the compiled files so it forces a rebuild if you have compiled before. The second one compiles it.

```
$ make clean
$ make
```

It should show actual compilation, warning, or error messages. Note that not all warnings are errors. The compiler should generate several `testcoop.*` files with different extensions:

- the `.hex` file can be opened directly in EdSim51
- the `.map` file shows the mapping of the symbols to their addresses after linking

```
Script started on Thu Oct 29 21:43:29 2020
[1m[7m%[27m[1m[0m
```

```
]2;mittyu@Mittyus-MacBook-Pro: ~/Desktop/BD3/OS/107034024-ppc1]1;..07034024-ppc1
[0m[27m[24m[J[01;32m→ [36m107034024-ppc1[00m [01;34mgit:
([31mmaster[34m) [33mx[00m [K[?1h=[?2004hscript typescript[17Dexit
[13Dmake clean[?1l>[?2004l
```

```
]2;make clean]1;makerm *.hex *.ihx *.lnk *.lst *.map *.mem *.rel *.rst
*.sym
rm: *.ihx: No such file or directory
rm: *.lnk: No such file or directory
```

```
make: *** [clean] Error 1
[1m[7m%[27m[1m[0m
```

```
]2;mittyu@Mittyus-MacBook-Pro: ~/Desktop/BD3/OS/107034024-ppc1]1;..07034024-ppc1
[0m[27m[24m[J[01;31m→ [36m107034024-ppc1[00m [01;34mgit:
([31mmaster[34m) [33mx[00m [K[?1h=[?2004hmake clean[10Dscript
typescript[17Dexit [13Dmake[?1l>[?2004l
```

```
]2;make]1;makesdcc -c testcoop.c
testcoop.c:51: warning 158: overflow in implicit constant conversion
sdcc -c cooperative.c
cooperative.c:197: warning 85: in function ThreadCreate unreferenced
function argument : 'fp'
sdcc -o testcoop.hex testcoop.rel cooperative.rel
[1m[7m%[27m[1m[0m
```

```

]2;mittyu@Mittyus-MacBook-Pro: ~/Desktop/BD3/OS/107034024-
ppc1]1;..07034024-ppc1
[0m[27m[24m[J[01;32m→ [36m107034024-ppc1[00m [01;34mgit:
([31mmaster[34m) [33mx[00m [K[?1h=[?2004heexit[?1l>[?2004l

```

```

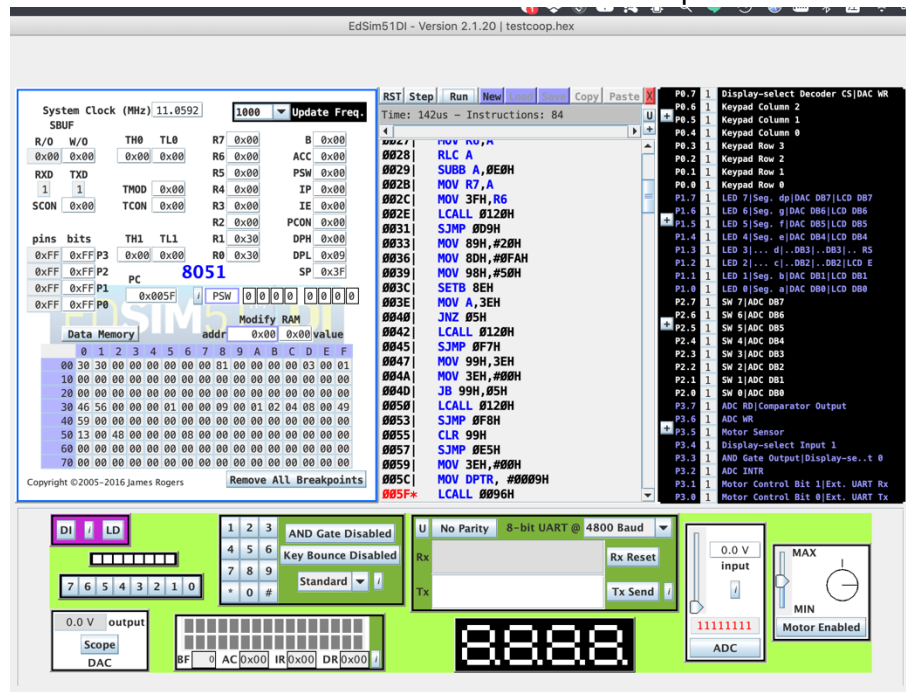
]2;exit]1;exit
Script done on Thu Oct 29 21:43:36 2020

```

## 3.2 [18 points] Screenshots and explanation

Look up the addresses for your symbols (i.e., functions, variables, etc) in the file `testcoop.map`. Set one or more breakpoints in EdSim51's assembly code window after you have assembled it.

- Take one screenshot before each `ThreadCreate` call. Explain how the stack changes.



- Take one screenshot when the Producer is running. How do you know?

EdSim51DI - Version 2.1.20 | testcoop.hex

System Clock (MHz) 11.0592 | 1000 Update Freq.

RST Step Run New Load Save Copy Paste

Executed 0x007E: LCALL 0096H | Time: 20us

Assembly Code:

```

0062: LJMPL 0033H
0065: LJMP 006CH
0068: RET
0069: RET
006A: RET
006B: RET
006C: MOV 35H, #00H
006F: MOV 3AH, #01H
0072: MOV 3BH, #02H
0075: MOV 3CH, #04H
0078: MOV 3DH, #08H
007B: MOV DPTR, #0059H
007E: LCALL 0096H
0081: MOV 34H, 82H
0084: MOV A, 34H
0086: ADD A, #30H
0088: MOV R1, A
0089: MOV 81H, @R1
008B: POP 80H
008D: POP 83H
008F: POP 82H
0091: POP 8FH
0093: POP 8EH
0095: RET
0096: MOV A, #0FH

```

Hardware Window:

- DI / LD: 7 6 5 4 3 2 1 0
- AND Gate Disabled
- Key Bounce Disabled
- Standard
- U: No Parity 8-bit UART @ 4800 Baud
- Rx Reset
- Tx Send
- 0.0 V output
- Scope DAC
- ADC: 11111111
- Motor Enabled

- Take one screenshot when the Consumer is running. How do you know?

EdSim51DI - Version 2.1.20 | testcoop.hex

System Clock (MHz) 11.0592 | 1000 Update Freq.

RST Step Run New Load Save Copy Paste

Executed 0x0062: LJMPL 0033H | Time: 290us

Assembly Code:

```

0033: MOV 89H, #20H
0036: MOV 8DH, #0FAH
0039: MOV 98H, #50H
003C: SETB 8EH
003E: MOV A, 3EH
0040: JNZ 05H
0042: LCALL 0120H
0045: SJMP 0F7H
0047: MOV 99H, 3EH
004A: MOV 3EH, #00H
004D: JB 99H, 05H
0050: LCALL 0120H
0053: SJMP 0F8H
0055: CLR 99H
0057: SJMP 0E5H
0059: MOV 3EH, #00H
005C: MOV DPTR, #0009H
005F: LCALL 0096H
0062: LJMP 0033H
0065: LJMP 006CH
0068: RET
0069: RET
006A: RET
006B: RET

```

Hardware Window:

- DI / LD: 7 6 5 4 3 2 1 0
- AND Gate Disabled
- Key Bounce Disabled
- Standard
- U: No Parity 8-bit UART @ 4800 Baud
- Rx Reset
- Tx Send
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- ADC: 11111111
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