3.1 [2 points] Typescript for compilation

```
project4 — -zsh — 80×24
[zhangjunteng@zhangjuntengdeMacBook-Air project4 % ls
                              preemptive.h
                                              test3threads.c
               preemptive.c
[zhangjunteng@zhangjuntengdeMacBook-Air project4 % make
sdcc -c test3threads.c
test3threads.c:65: warning 158: overflow in implicit constant conversion
sdcc -c preemptive.c
preemptive.c:184: warning 85: in function ThreadCreate unreferenced function arg
ument : 'fp'
preemptive.c:226: warning 158: overflow in implicit constant conversion
sdcc -o test3threads.hex test3threads.rel preemptive.rel
[zhangjunteng@zhangjuntengdeMacBook-Air project4 % ls
Makefile
                        preemptive.rst
                                                test3threads.1st
                        preemptive.sym
preemptive.asm
                                                test3threads.map
preemptive.c
                       test3threads.asm
                                               test3threads.mem
preemptive.h
                       test3threads.c
                                               test3threads.rel
preemptive.lst
                       test3threads.hex
                                               test3threads.rst
                                                test3threads.sym
preemptive.rel
                        test3threads.lk
[zhangjunteng@zhangjuntengdeMacBook-Air project4 % make clean
rm *.hex *.ihx *.lnk *.lst *.map *.mem *.rel *.rst *.sym *.asm *.lk
rm: *.ihx: No such file or directory
rm: *.lnk: No such file or directory
make: *** [clean] Error 1
zhangjunteng@zhangjuntengdeMacBook-Air project4 %
```

3.2 [18 points] Screenshots and explanation

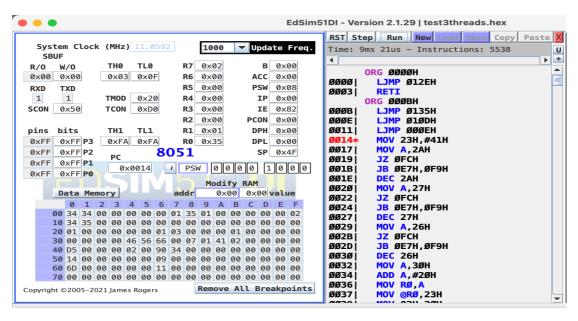
```
test3threads.map
        Value Global
                                                                    Global Defined In Module
Hexadecimal [32-Bits]
                                                                                        Decimal Bytes (Attributes)
Area
                                                       Addr
                                                                        Size
 CSEG
                                                  00000014
                                                                  000003B7 =
                                                                                            951. bytes (REL,CON,CODE)
        Value Global
                                                                    Global Defined In Module
                    _Producer1
_Producer2
_Consumer
00000014
                                                                     test3threads
       0000006D
000000C6
                                                                     test3threads
                                                                     test3threads
       0000010D
                    _main
                                                                     test3threads
       00000135
00000132
00000133
00000134
00000135
                    __main
__sdcc_gsinit_startup
_mcs51_genRAMCLEAR
_mcs51_genXINIT
_mcs51_genXRAMCLEAR
_timer0_ISR
_Bootstrap
                                                                     test3threads
                                                                     test3threads
                                                                     test3threads
                                                                     test3threads
                                                                     test3threads
       00000139
                                                                     preemptive
       0000015F
000001F5
                    _myTimer0Handler
_ThreadCreate
                                                                     preemptive
                                                                     preemptive
                    _ThreadYield
_ThreadExit
       0000026F
                                                                     preemptive
       000002D7
                                                                     preemptive
_moduint
       00000348
                       _moduint
                    __modsint
       00000395
                                                                     _modsint
```

•

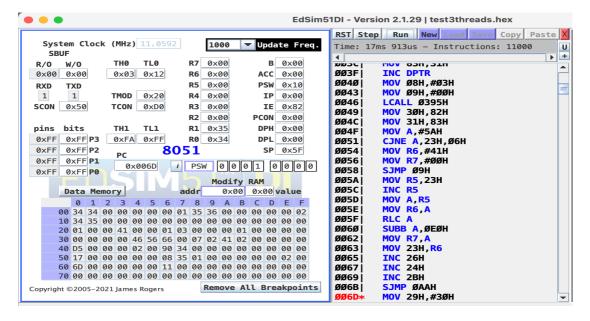
 Take screenshots when the Producer1 and Producer2 running and show semaphore changes.

```
data
        at(0x20)
                         buffer[3];
        at(0x23)
                         Token;
data
        at(0x24)
                       full;
data
                   int
data
        at(0x26)
                   char
                         mutex:
data
        at(0x27
                        empty;
        at(0x29)
                         Token2;
data
                   char
        at(0x2A)
                   char
data
                         turn:
        at(0x2B)
data
        at(0x30)
data
                   int
                        in;
        _at((0x32))
data
                  int out;
```

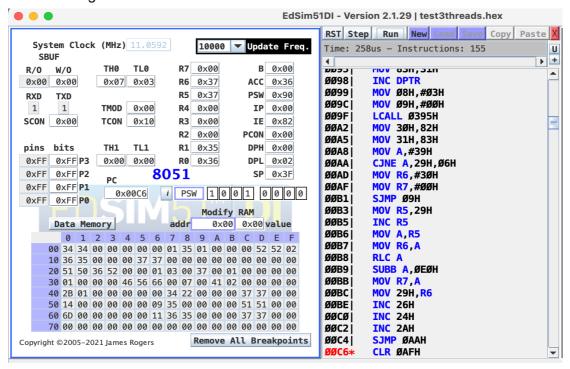
Observing full, Empty and mutex, their address could change during the process! Turn is used to determined which processes running Producer1:

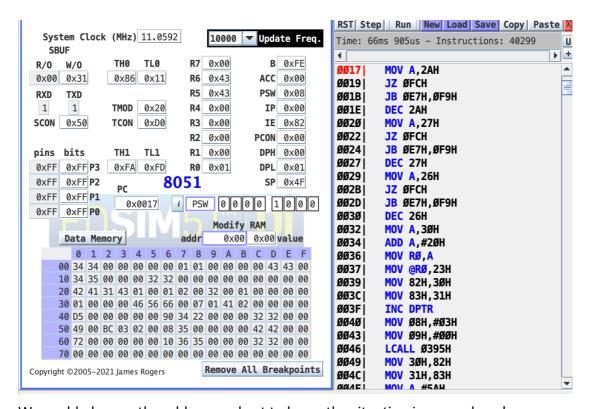


Producer2:



 Take screenshots when the Consumer is running and show semaphore changes.





We could observe the address and get to know the situation in semaphore!

• Show and explain UART output to show the unfair version, if any, and the fair version.



Unfair would not be able to take turns in the two process!