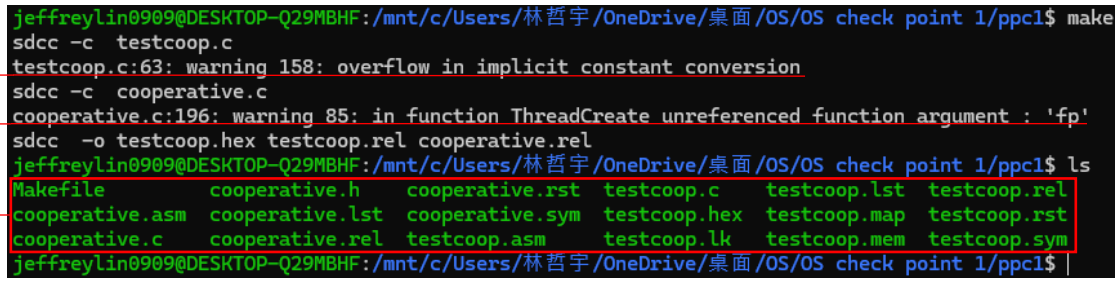
Programming Project Checkpoint 1

111062311 林哲宇

1. Screenshot for compilation:



- The warning message is because of setting TH1 to negative number (-6 for UART baud rate), and it's totally safe.
- The warning message is because of using DPH/DPL instead of identifier of parameter, and it's totally safe.
- Files generated after compilation (including .hex and .map).

Note: for better understanding for following explanation, here's the variable address map of my code:

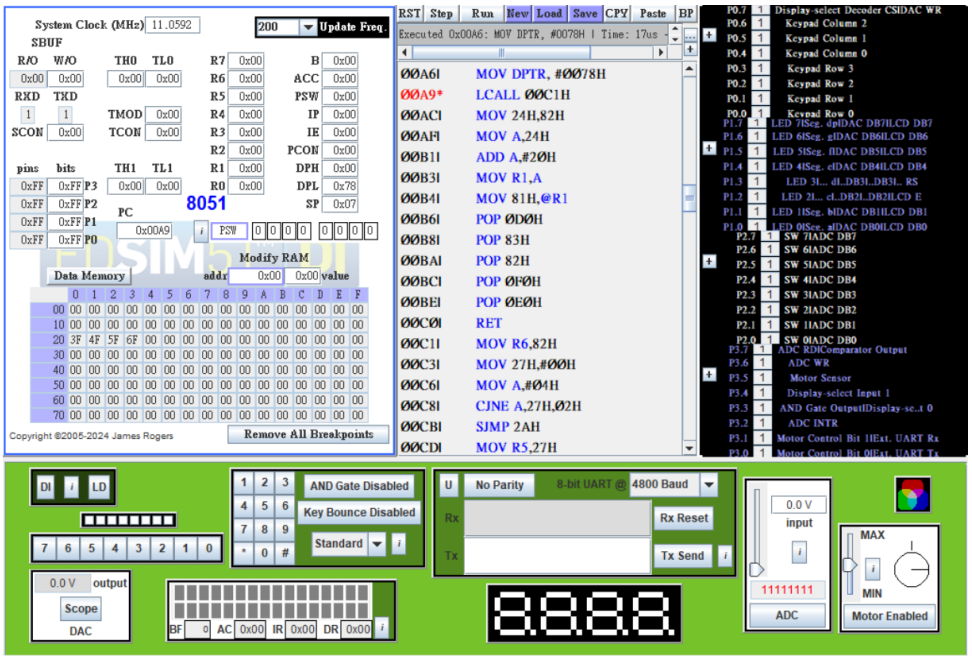
```
00000020  _T_SP (20~23,1 address space each entry)    cooperative
00000024  _current_T                                  cooperative
00000025  _tmp0                                       cooperative
00000026  _tmp1                                       cooperative
00000027  _tmp2                                       cooperative
00000028  _bitmap                                     cooperative
0000002C  _b_start                                    testcoop
0000002D  _b_end                                      testcoop
0000002E  _in_counter                                 testcoop
00000030  _buffer (30~3F,1 address space each entry)  testcoop
```

And here's the function address map:

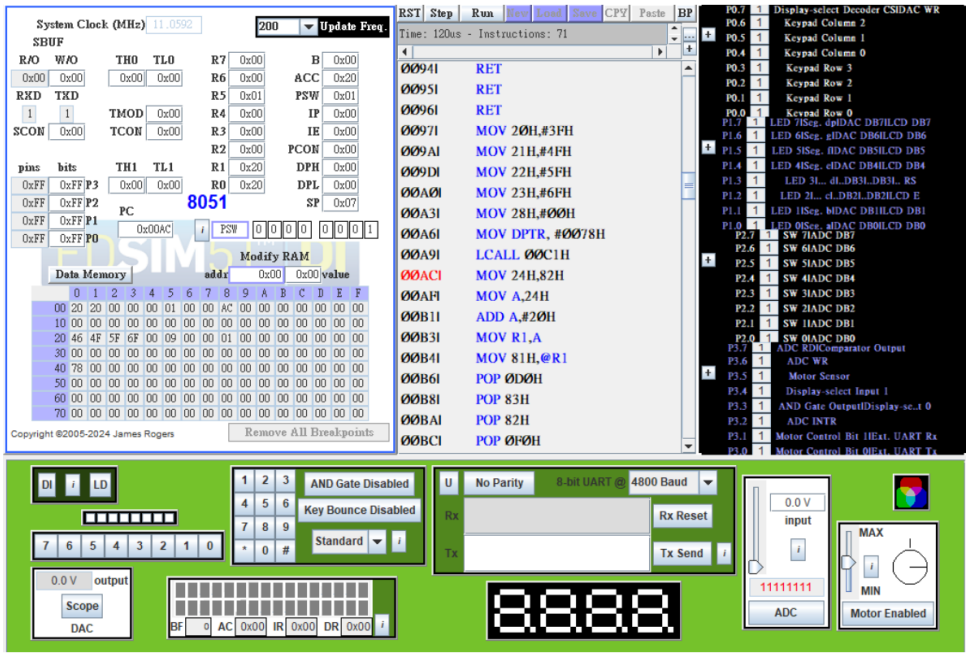
```
00000009  _Producer                 testcoop
00000048  _Consumer                 testcoop
00000078  _main                     testcoop
00000090  __sdcc_gsinit_startup     testcoop
00000094  __mcs51_genRAMCLEAR       testcoop
00000095  __mcs51_genXINIT          testcoop
00000096  __mcs51_genXRAMCLEAR      testcoop
00000097  _Bootstrap                cooperative
000000C1  _ThreadCreate             cooperative
00000145  _ThreadYield              cooperative
00000196  _ThreadExit               cooperative
```

2. Screenshot and explanation:

Before **`ThreadCreate(main)`**:



After **`ThreadCreate(main)`**:

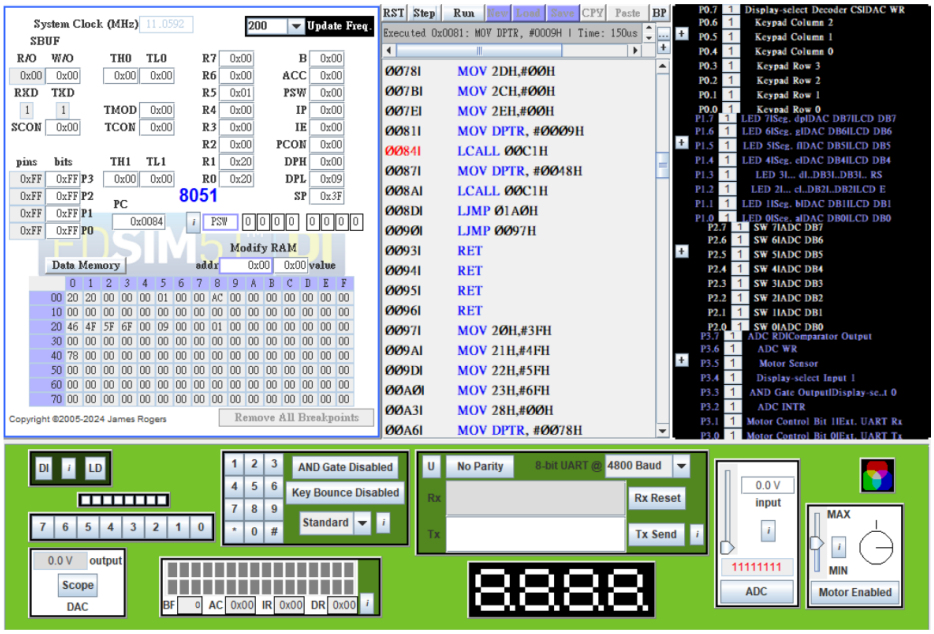


We can see that after **`ThreadCreate(main)`**, we can see:

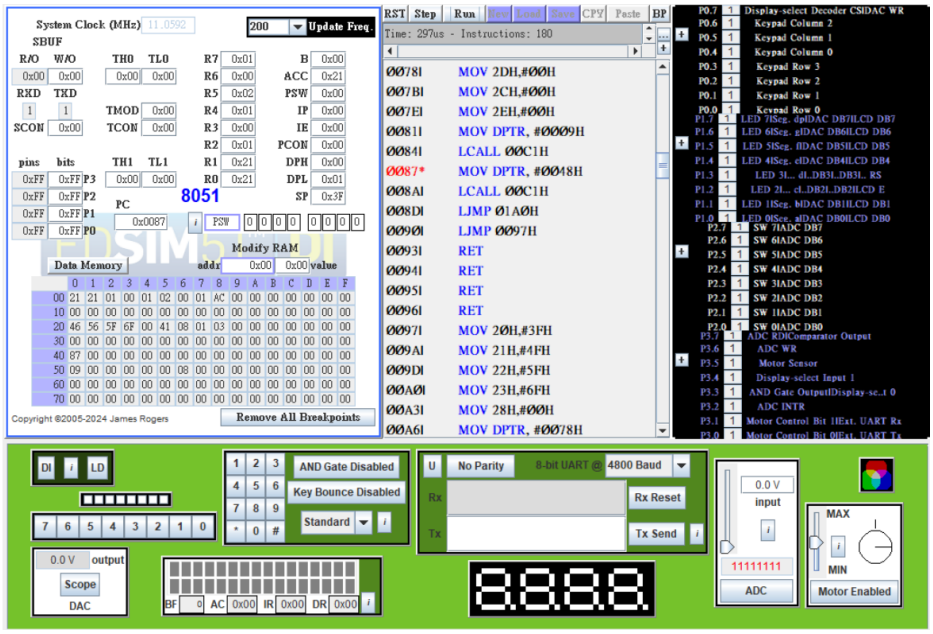
- **SP of thread #0 (address: 0x20) is changed to 46**
- **the bottom of stack of thread #0 (address: 0x40~0x41) is changed to 0078, which is the address of main function**
- **thread bitmap (address: 0x28) is also changed from 0000 to 0001**

meaning main function is assigned to thread #0.

Before **`ThreadCreate(Producer)`**:



After **`ThreadCreate(Producer)`**:

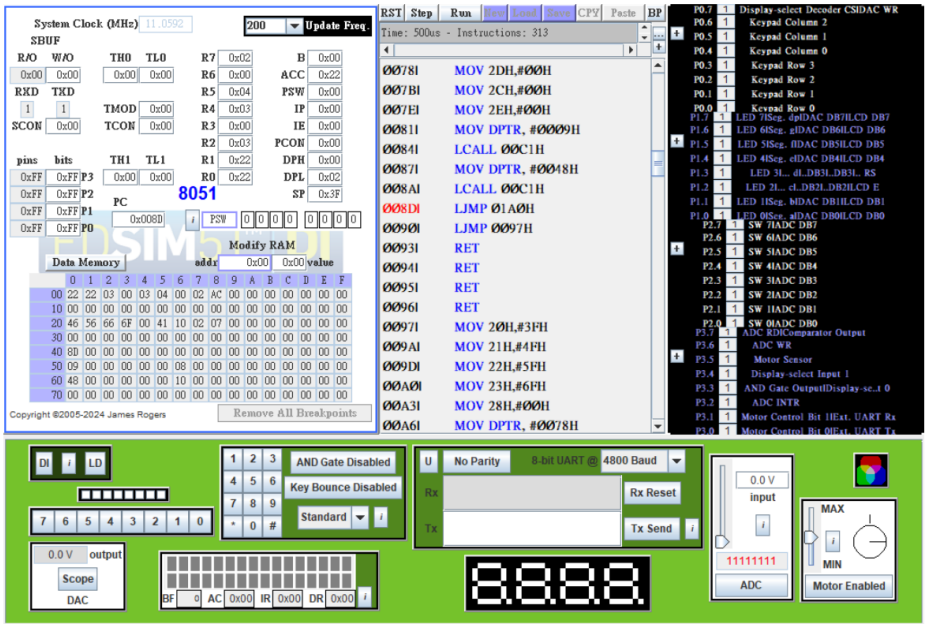


We can see that after **`ThreadCreate(Producer)`**, we can see:

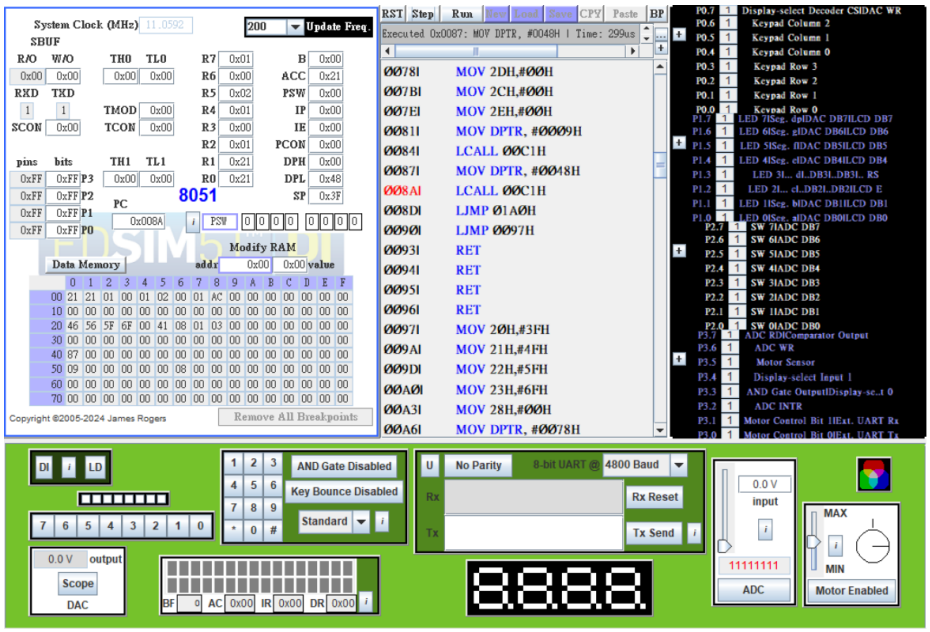
- **SP of thread #1 (address: 0x21) is changed to 56**
- **the bottom of stack of thread #1 (address: 0x50~0x51) is changed to 0009, which is the address of Producer function**
- **thread bitmap (address: 0x28) is also changed from 0001 to 0011**

meaning Producer function is assigned to thread #1.

Before **`ThreadCreate(Consumer)`**:



After **`ThreadCreate(Consumer)`**:

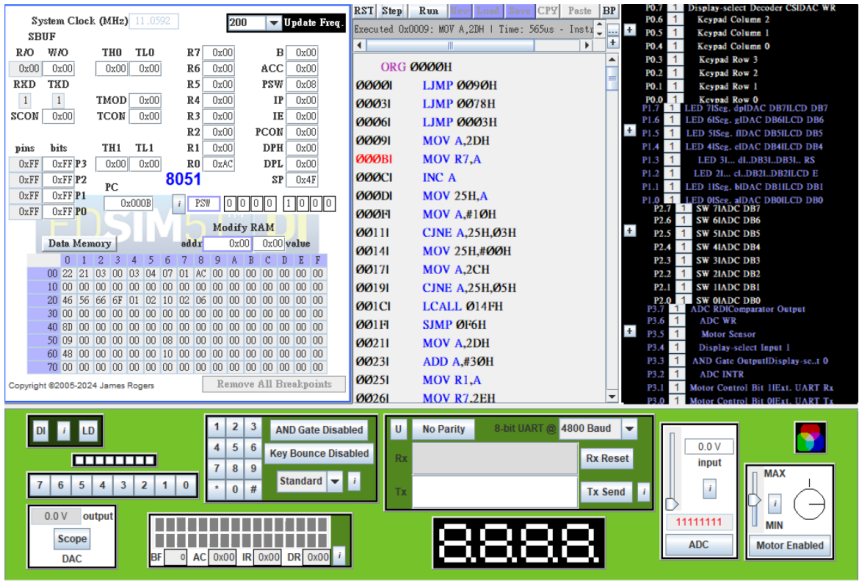


We can see that after **`ThreadCreate(Consumer)`**, we can see:

- **SP of thread #2 (address: 0x22) is changed to 66**
- **the bottom of stack of thread #2 (address: 0x60~0x61) is changed to 0048, which is the address of Consumer function**
- **thread bitmap (address: 0x28) is also changed from 0011 to 0111**

meaning Consumer function is assigned to thread #2.

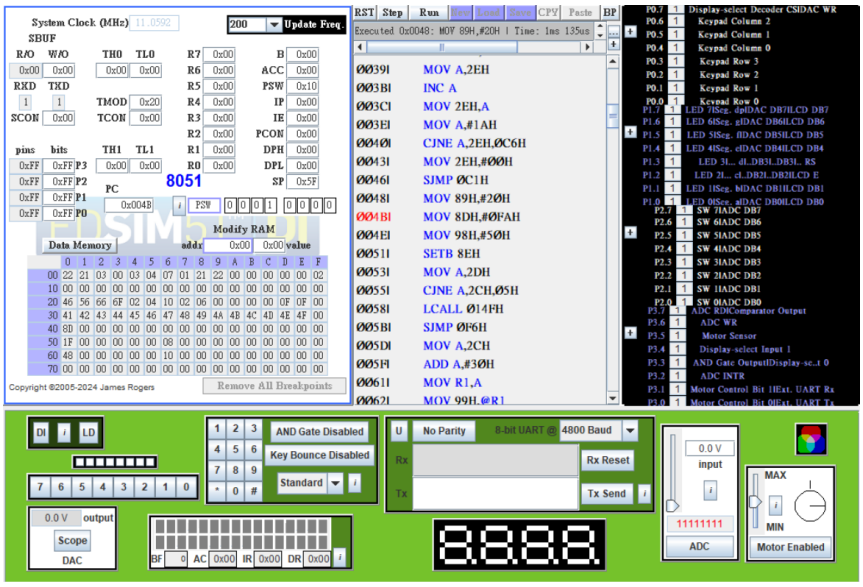
One screenshot when the Producer is running:



How do I know:

- Precise: since PC is in the code section of the function (0x09≤PC<0x48).
- Roughly (ignore thread management function): Current thread number (address: 0x24) is 1.

One screenshot when the Consumer is running:



How do I know:

- Precise: since PC is in the code section of the function (0x48≤PC<0x78).
- Roughly (ignore thread management function): Current thread number (address: 0x24) is 2.