

嵌入式系統-
cygwin步驟與makefile寫法
(期中考重點需熟記每個指令)

cygwin步驟與gdb模式

1.事前準備兩個C程式碼存於C槽



備註:存於C槽(需自建一個資料夾內)

hello.c



C:\wk\hello.c - Notepad++

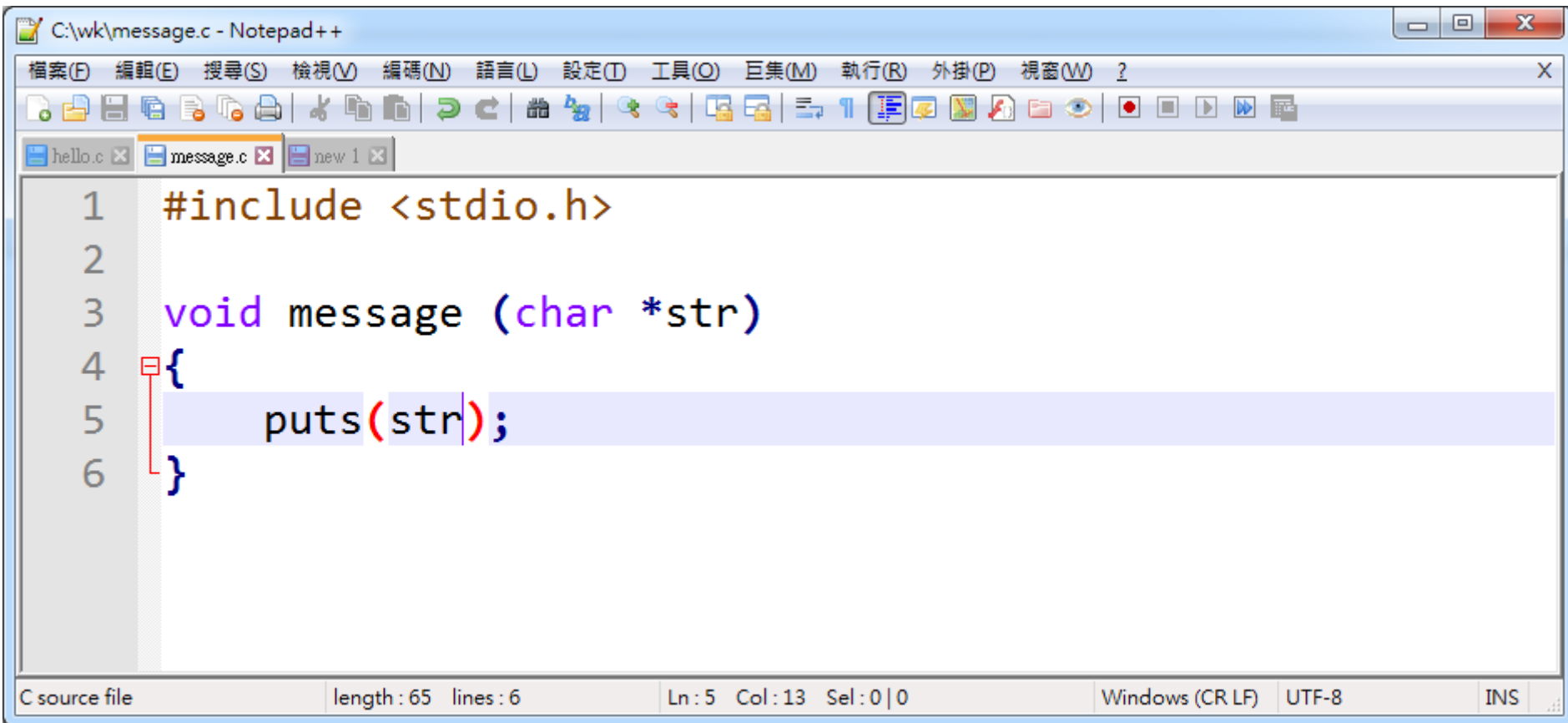
檔案(F) 編輯(E) 搜尋(S) 檢視(V) 編碼(N) 語言(L) 設定(I) 工具(O) 巨集(M) 執行(R) 外掛(P) 視窗(W) ?

hello.c x message.c x new 1 x

```
1 #include <stdio.h>
2
3 void message(char *str);
4 int main()
5 {
6     int i;
7     for(i=0; i<5; i++)
8         message("Andes4070E021");
9 }
```

C source file length : 124 lines : 9 Ln : 3 Col : 25 Sel : 0 | 0 Windows (CR LF) UTF-8 INS

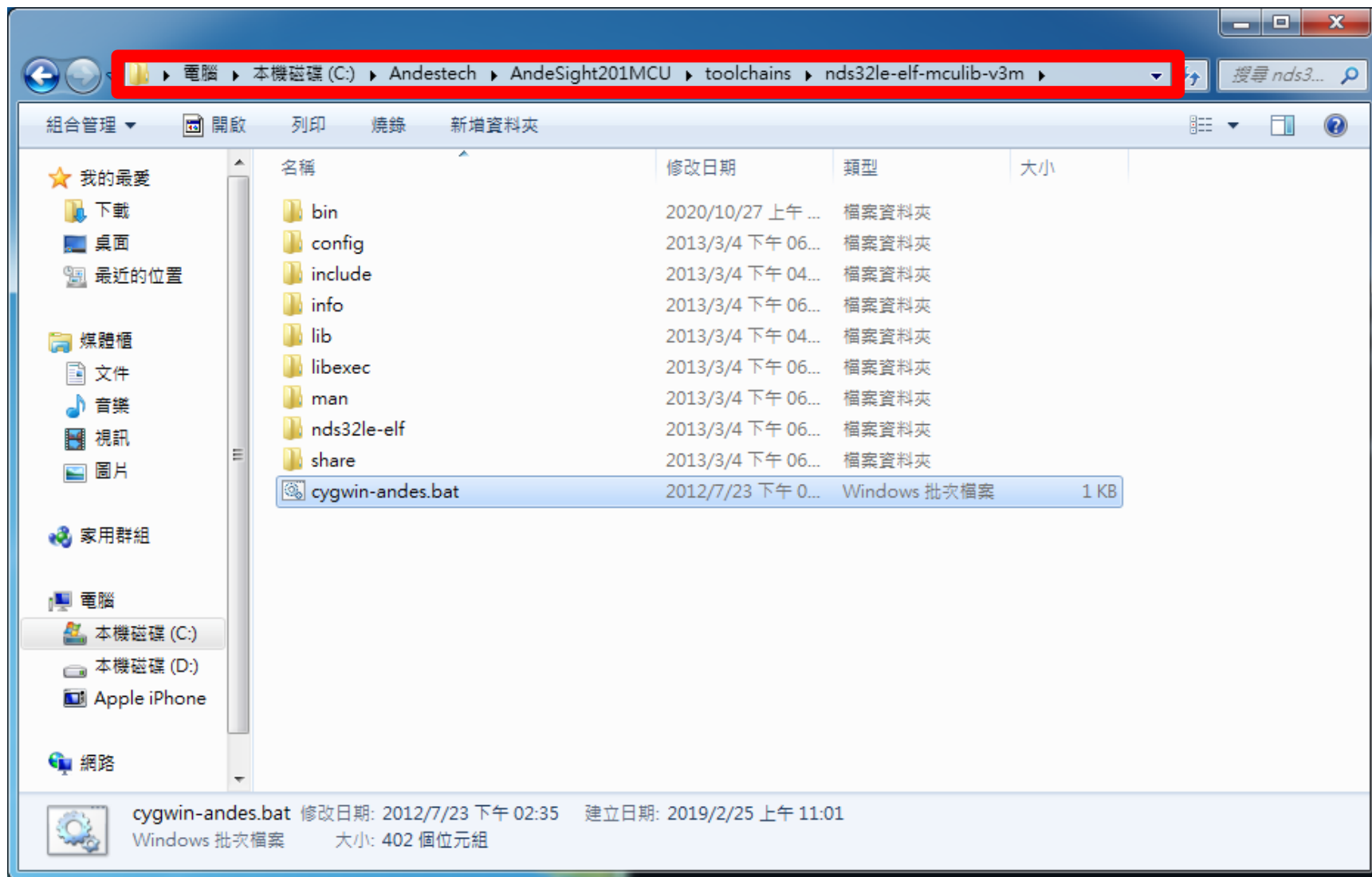
message.c



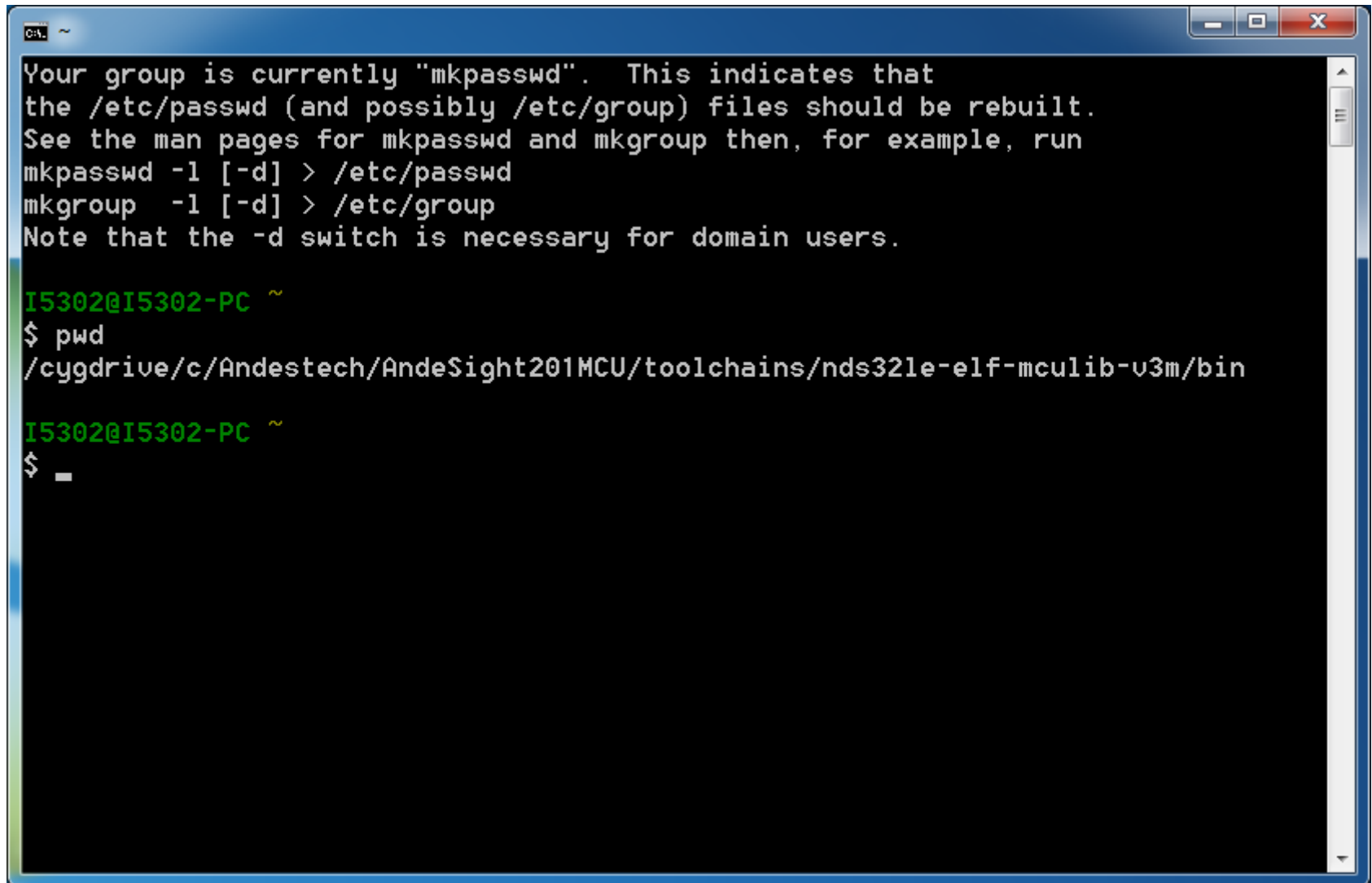
```
C:\wk\message.c - Notepad++
檔案(F) 編輯(E) 搜尋(S) 檢視(V) 編碼(N) 語言(L) 設定(I) 工具(O) 巨集(M) 執行(R) 外掛(P) 視窗(W) ?
hello.c x message.c x new 1 x
1  #include <stdio.h>
2
3  void message (char *str)
4  {
5      puts(str);
6  }
```

C source file length : 65 lines : 6 Ln : 5 Col : 13 Sel : 0 | 0 Windows (CR LF) UTF-8 INS

2.將Andestech內.bat打開

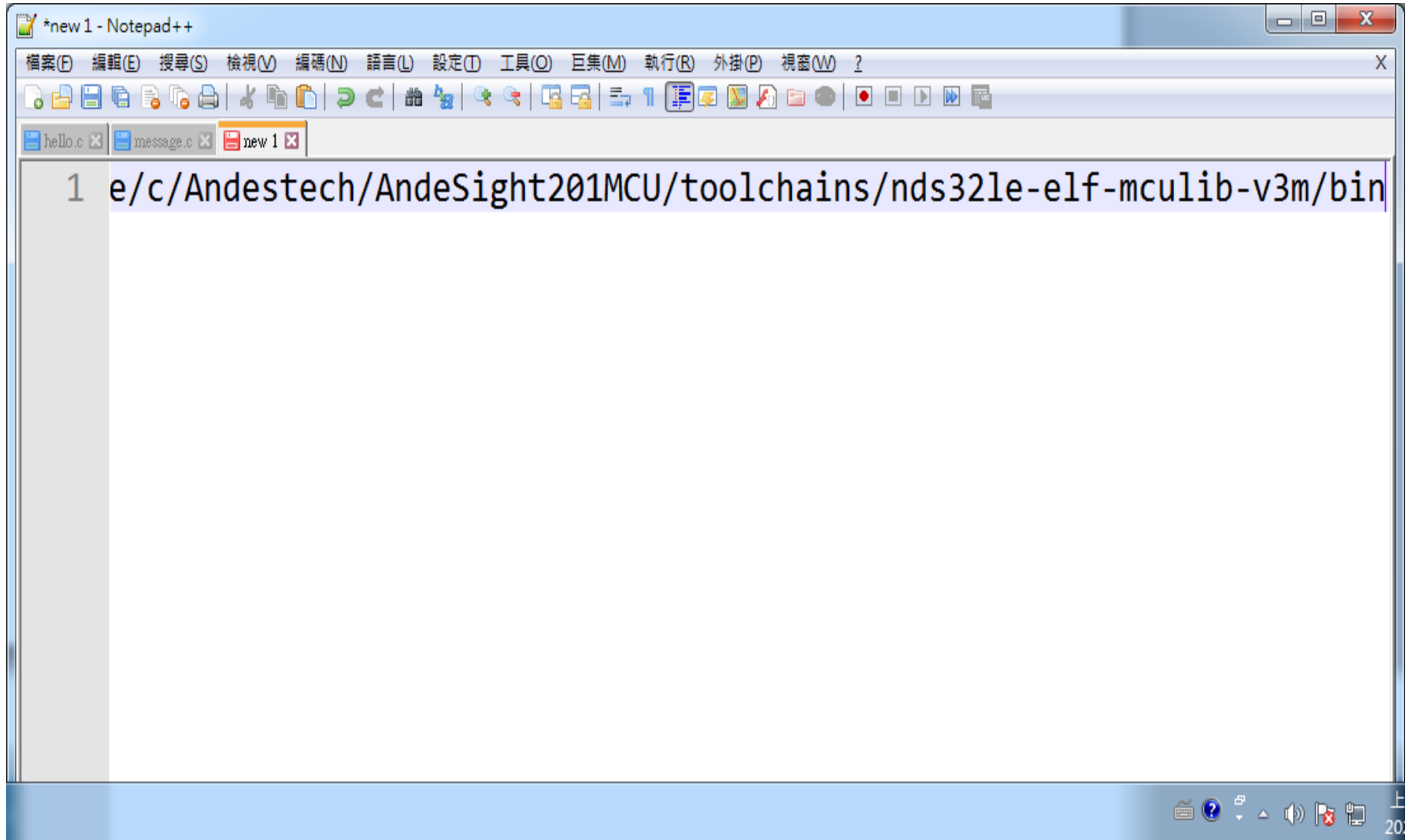


3.顯示現在所在目錄

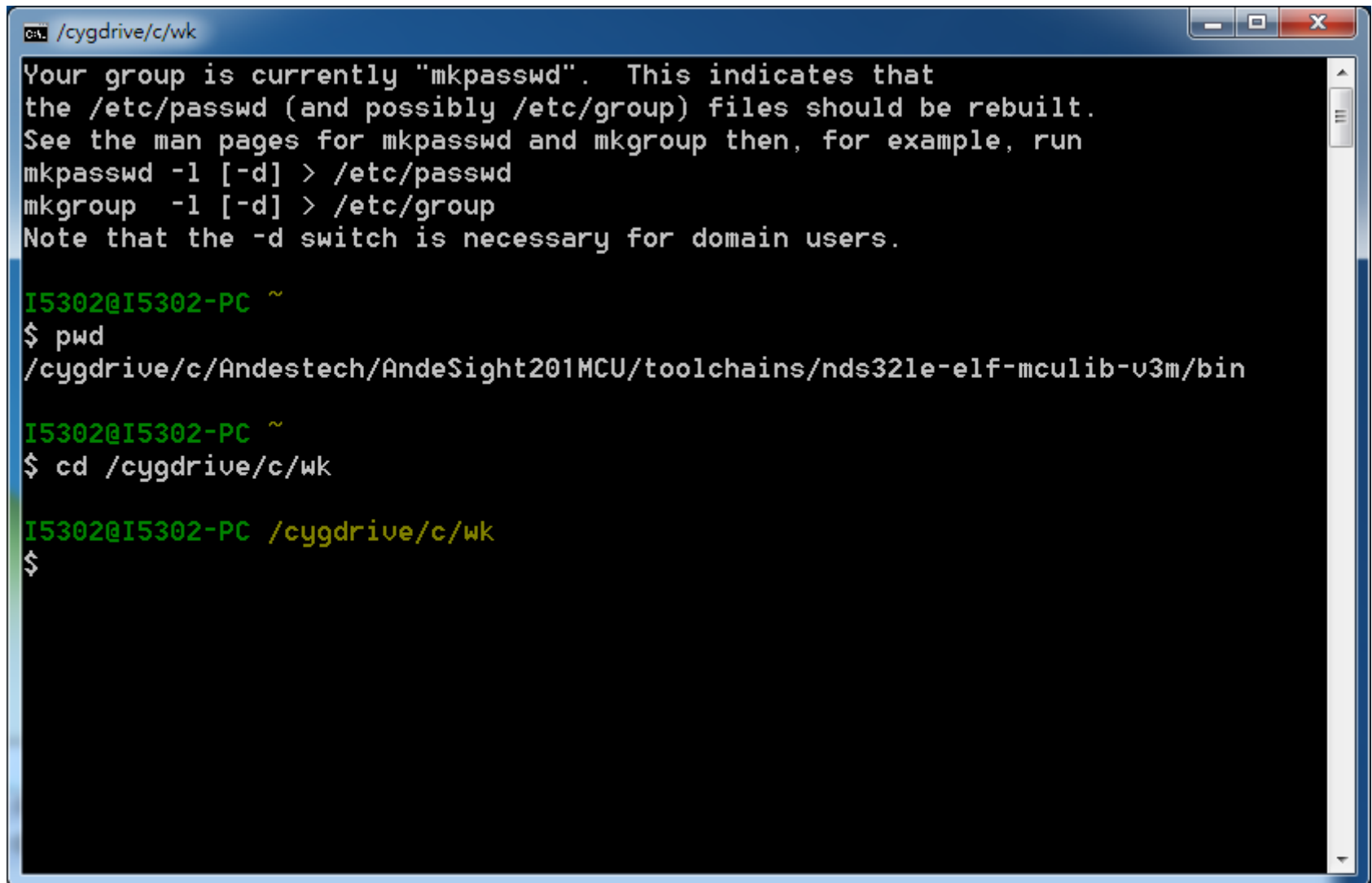
A screenshot of a Windows-style terminal window with a blue title bar. The window contains text about rebuilding password and group files, followed by a command prompt session. The prompt is 'I5302@I5302-PC ~'. The user enters 'pwd', and the output is a long path: '/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin'. The prompt then changes to '\$ _' after a space is entered.

```
~  
Your group is currently "mkpasswd". This indicates that  
the /etc/passwd (and possibly /etc/group) files should be rebuilt.  
See the man pages for mkpasswd and mkgroup then, for example, run  
mkpasswd -l [-d] > /etc/passwd  
mkgroup -l [-d] > /etc/group  
Note that the -d switch is necessary for domain users.  
  
I5302@I5302-PC ~  
$ pwd  
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin  
  
I5302@I5302-PC ~  
$ _
```

先將此路徑貼到notepad++



4.將路徑轉到C槽自建資料夾



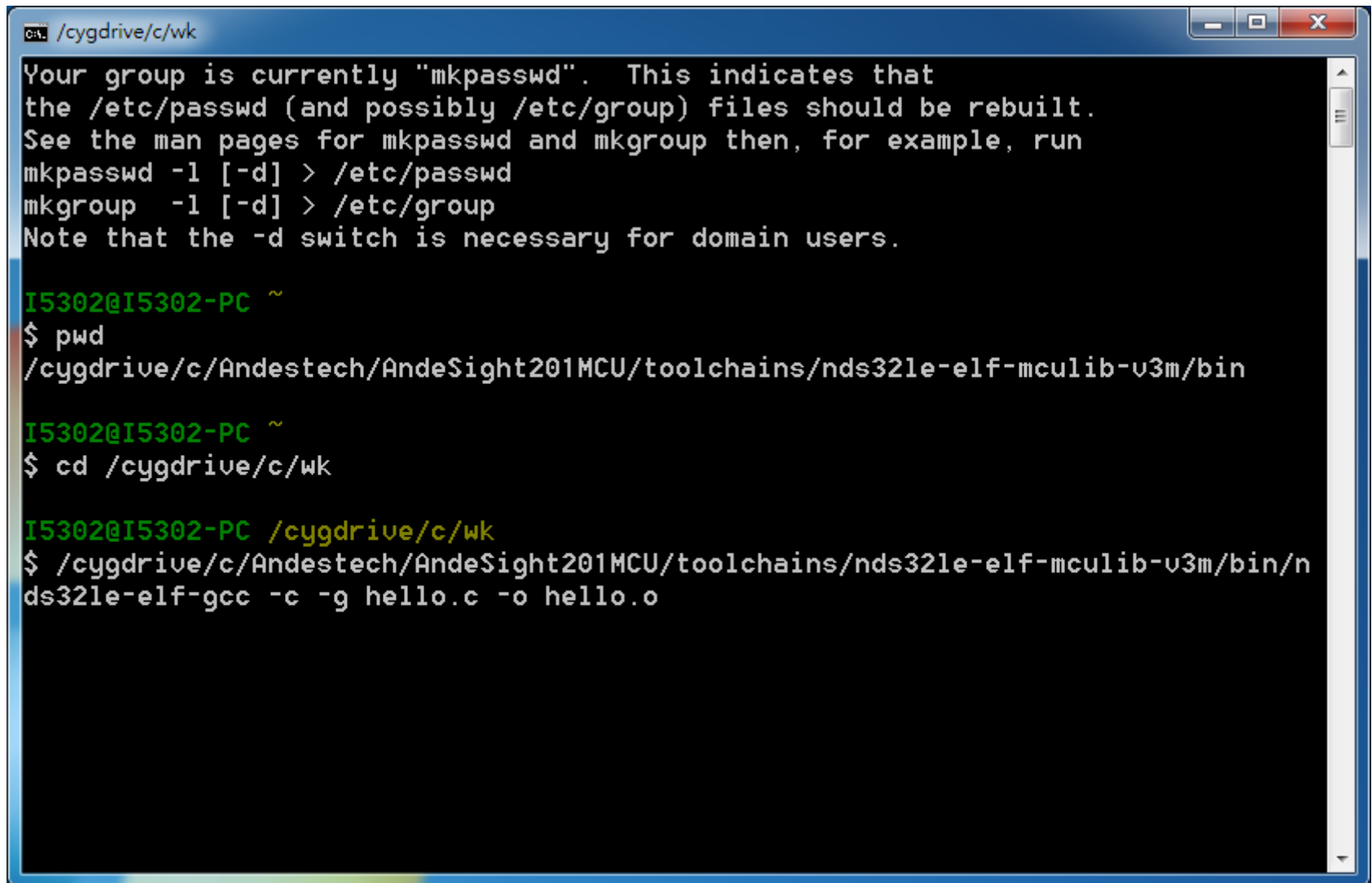
```
cyg /cygdrive/c/wk
Your group is currently "mkpasswd". This indicates that
the /etc/passwd (and possibly /etc/group) files should be rebuilt.
See the man pages for mkpasswd and mkgroup then, for example, run
mkpasswd -l [-d] > /etc/passwd
mkgroup -l [-d] > /etc/group
Note that the -d switch is necessary for domain users.

I5302@I5302-PC ~
$ pwd
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin

I5302@I5302-PC ~
$ cd /cygdrive/c/wk

I5302@I5302-PC /cygdrive/c/wk
$
```

5.將hello.c轉換為hello.o



```
C:\ /cygdrive/c/wk
Your group is currently "mkpasswd". This indicates that
the /etc/passwd (and possibly /etc/group) files should be rebuilt.
See the man pages for mkpasswd and mkgroup then, for example, run
mkpasswd -l [-d] > /etc/passwd
mkgroup -l [-d] > /etc/group
Note that the -d switch is necessary for domain users.

I5302@I5302-PC ~
$ pwd
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin

I5302@I5302-PC ~
$ cd /cygdrive/c/wk

I5302@I5302-PC /cygdrive/c/wk
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g hello.c -o hello.o
```

6. 將message.c轉換為message.o， 並檢視所有.c與.o檔

```
I5302@I5302-PC /cygdrive/c/wk
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g message.c -o message.o

I5302@I5302-PC /cygdrive/c/wk
$ ls *.o
[1] 5172
bash: *.o: command not found

I5302@I5302-PC /cygdrive/c/wk
$ ls hello.c hello.o message.c message.o

[1]+  Done                  ls
```

7.將兩個.o檔轉換為.adx檔

```
I5302@I5302-PC /cygdrive/c/wk  
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium hello.o message.o -g -o hello.adx
```

8.進入gdb模式

```
I5302@I5302-PC /cygdrive/c/wk
```

```
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gdb ./hello.adx
```

```
GNU gdb (2013-03-04) 7.3
```

```
Copyright (C) 2011 Free Software Foundation, Inc.
```

```
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
```

```
This is free software: you are free to change and redistribute it.
```

```
There is NO WARRANTY, to the extent permitted by law. Type "show copying"  
and "show warranty" for details.
```

```
This GDB was configured as "--host=i686-mingw32 --target=nds32le-elf".
```

```
For bug reporting instructions, please see:
```

```
<http://www.gnu.org/software/gdb/bugs/>...
```

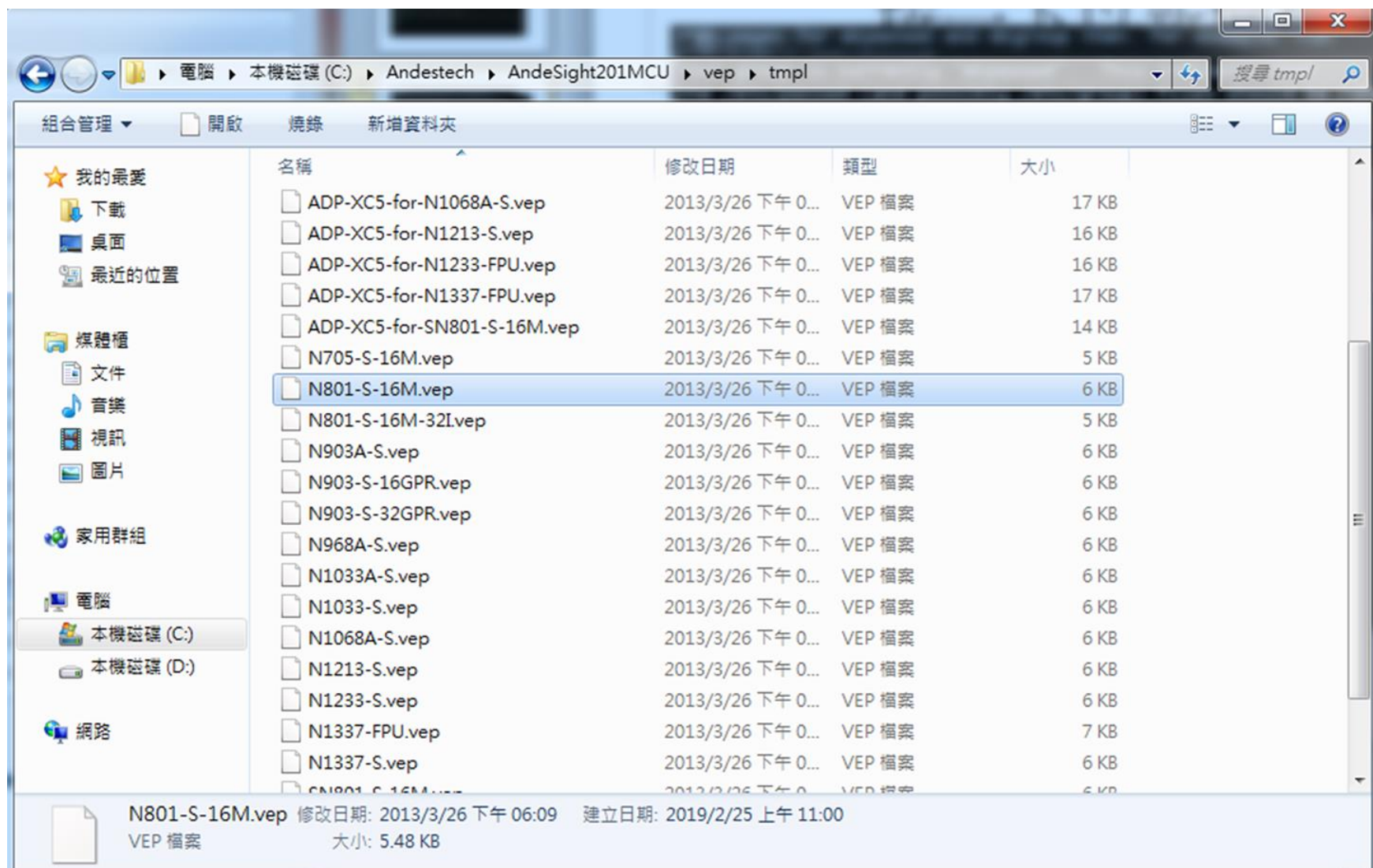
```
[info] Loading nds32-elf.gdbinit.
```

```
[info] nds32-elf.gdbinit loaded.
```

```
Reading symbols from c:\wk\hello.adx...done.
```

```
(gdb) _
```

*此時須先把以下檔案複製到sid/ins內



9.(1)開啟另一個.bat當作連線(2)切換路徑 (3)編譯成.conf(4)執行.conf

```
C:\ /cygdrive/c/Andestech/AndeSight201MCU/sid
See the man pages for mkpasswd and mkgroup then, for example, run
mkpasswd -l [-d] > /etc/passwd
mkgroup -l [-d] > /etc/group
Note that the -d switch is necessary for domain users.

I5302@I5302-PC ~
$ cd /cygdrive/c/Andestech/AndeSight201MCU/sid/ins

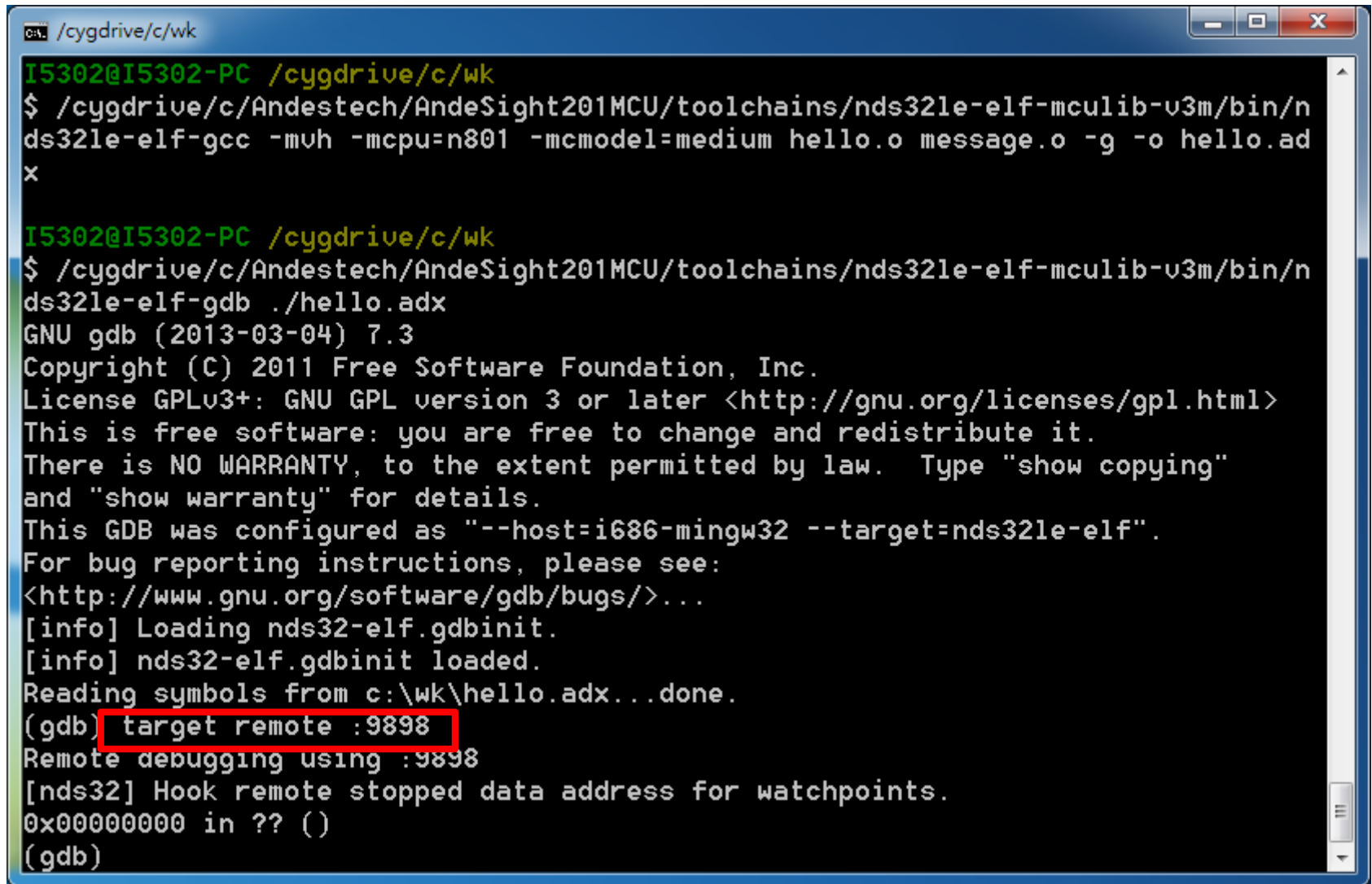
I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid/ins
$ ./vep2conf.exe -m gdb N801-S-16M.vep -o N801.conf

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid/ins
$ cd ..

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801-s.conf
N801-s.conf: No such file or directory
Configuration error. Aborting.

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801.conf
socketiobase: using fd 4
socketiobase: server at 0.0.0.0:9898
GDB init ...
```

10.gdb建立連線



```

C:\ /cygdrive/c/wk
I5302@I5302-PC /cygdrive/c/wk
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium hello.o message.o -g -o hello.adx
x

I5302@I5302-PC /cygdrive/c/wk
$ /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gdb ./hello.adx
GNU gdb (2013-03-04) 7.3
Copyright (C) 2011 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "--host=i686-mingw32 --target=nds32le-elf".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
[info] Loading nds32-elf.gdbinit.
[info] nds32-elf.gdbinit loaded.
Reading symbols from c:\wk\hello.adx...done.
(gdb) target remote :9898
Remote debugging using :9898
[nds32] Hook remote stopped data address for watchpoints.
0x00000000 in ?? ()
(gdb)

```


*此時(連線用)顯示成功

```

C:\ /cygdrive/c/Andestech/AndeSight201MCU/sid
mkpasswd -l [-d] > /etc/passwd
mkgroup -l [-d] > /etc/group
Note that the -d switch is necessary for domain users.

I5302@I5302-PC ~
$ cd /cygdrive/c/Andestech/AndeSight201MCU/sid/ins

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid/ins
$ ./uep2conf.exe -m gdb N801-S-16M.uep -o N801.conf

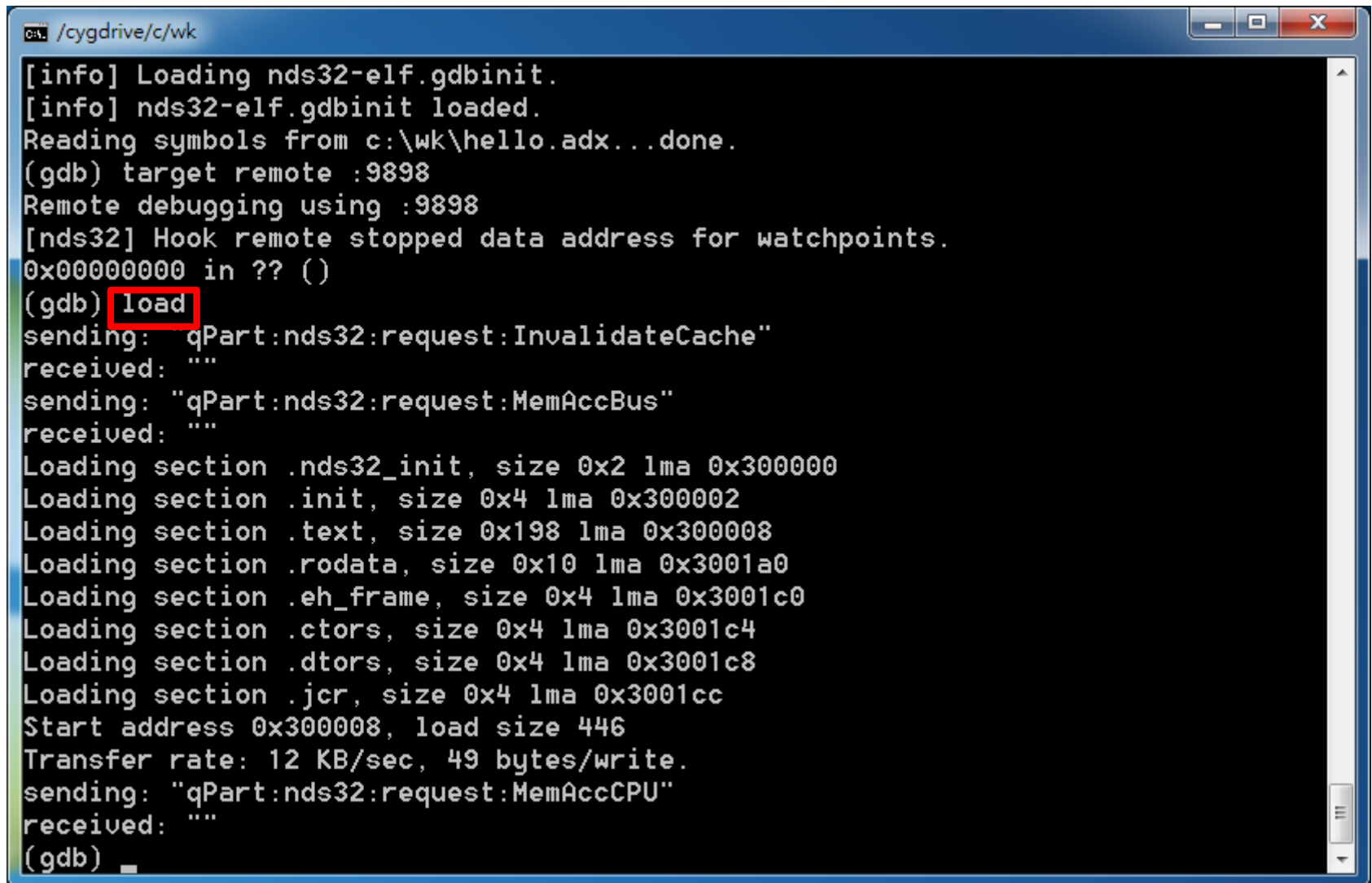
I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid/ins
$ cd ..

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801-s.conf
N801-s.conf: No such file or directory
Configuration error. Aborting.

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801.conf
socketiobase: using fd 4
socketiobase: server at 0.0.0.0:9898
GDB init ...
socketio: accepted connection from 127.0.0.1:51593, fd 5

```

11.載入程式



A screenshot of a GDB terminal window. The title bar shows the path `/cygdrive/c/wk`. The terminal output shows the following sequence of events:

```
[info] Loading nds32-elf.gdbinit.  
[info] nds32-elf.gdbinit loaded.  
Reading symbols from c:\wk\hello.adx...done.  
(gdb) target remote :9898  
Remote debugging using :9898  
[nds32] Hook remote stopped data address for watchpoints.  
0x00000000 in ?? ()  
(gdb) load  
sending: "qPart:nds32:request:InvalidateCache"  
received: ""  
sending: "qPart:nds32:request:MemAccBus"  
received: ""  
Loading section .nds32_init, size 0x2 lma 0x300000  
Loading section .init, size 0x4 lma 0x300002  
Loading section .text, size 0x198 lma 0x300008  
Loading section .rodata, size 0x10 lma 0x3001a0  
Loading section .eh_frame, size 0x4 lma 0x3001c0  
Loading section .ctors, size 0x4 lma 0x3001c4  
Loading section .dtors, size 0x4 lma 0x3001c8  
Loading section .jcr, size 0x4 lma 0x3001cc  
Start address 0x300008, load size 446  
Transfer rate: 12 KB/sec, 49 bytes/write.  
sending: "qPart:nds32:request:MemAccCPU"  
received: ""  
(gdb) _
```

The word `load` in the command `(gdb) load` is highlighted with a red rectangle.

12.顯示程式結果

```
C:\ /cygdrive/c/wk
sending: "qPart:nds32:request:InvalidateCache"
received: ""
sending: "qPart:nds32:request:MemAccBus"
received: ""
Loading section .nds32_init, size 0x2 lma 0x300000
Loading section .init, size 0x4 lma 0x300002
Loading section .text, size 0x198 lma 0x300008
Loading section .rodata, size 0x10 lma 0x3001a0
Loading section .eh_frame, size 0x4 lma 0x3001c0
Loading section .ctors, size 0x4 lma 0x3001c4
Loading section .dtors, size 0x4 lma 0x3001c8
Loading section .jcr, size 0x4 lma 0x3001cc
Start address 0x300008, load size 446
Transfer rate: 12 KB/sec, 49 bytes/write.
sending: "qPart:nds32:request:MemAccCPU"
received: ""
(gdb) cont
Continuing.
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
[Inferior 1 (Remote target) exited with code 05]
(gdb)
```

*此時(連線用)也會顯示結果

```
C:\ /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./uep2conf.exe -m gdb N801-S-16M.uep -o N801.conf

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid/ins
$ cd ..

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801-s.conf
N801-s.conf: No such file or directory
Configuration error. Aborting.

I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801.conf
socketio: using fd 4
socketio: server at 0.0.0.0:9898
GDB init ...
socketio: accepted connection from 127.0.0.1:51593, fd 5
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
socketio: ieof1
GDB fini skipped
GDB init skipped
```

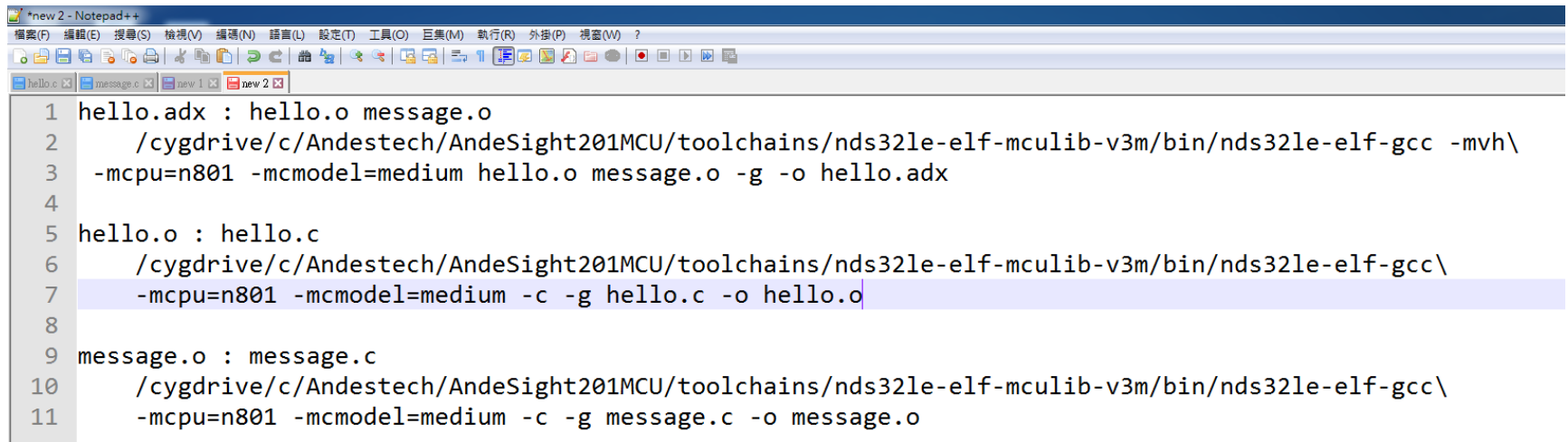
13.跳出gdb

```
C:\ /cygdrive/c/wk
received: ""
Loading section .nds32_init, size 0x2 lma 0x300000
Loading section .init, size 0x4 lma 0x300002
Loading section .text, size 0x198 lma 0x300008
Loading section .rodata, size 0x10 lma 0x3001a0
Loading section .eh_frame, size 0x4 lma 0x3001c0
Loading section .ctors, size 0x4 lma 0x3001c4
Loading section .dtors, size 0x4 lma 0x3001c8
Loading section .jcr, size 0x4 lma 0x3001cc
Start address 0x300008, load size 446
Transfer rate: 12 KB/sec, 49 bytes/write.
sending: "qPart:nds32:request:MemAccCPU"
received: ""
(gdb) cont
Continuing.
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
[Inferior 1 (Remote target) exited with code 05]
(gdb) q

I5302@I5302-PC /cygdrive/c/wk
$
```

makefile寫法(一)與確認無誤 (存於C槽自建資料夾內)

1.最初makefile寫法



```
1 hello.adx : hello.o message.o
2     /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -mvh\
3     -mcpu=n801 -mcmmodel=medium hello.o message.o -g -o hello.adx
4
5 hello.o : hello.c
6     /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc\
7     -mcpu=n801 -mcmmodel=medium -c -g hello.c -o hello.o
8
9 message.o : message.c
10    /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc\
11    -mcpu=n801 -mcmmodel=medium -c -g message.c -o message.o
```

2.檢視所有檔案

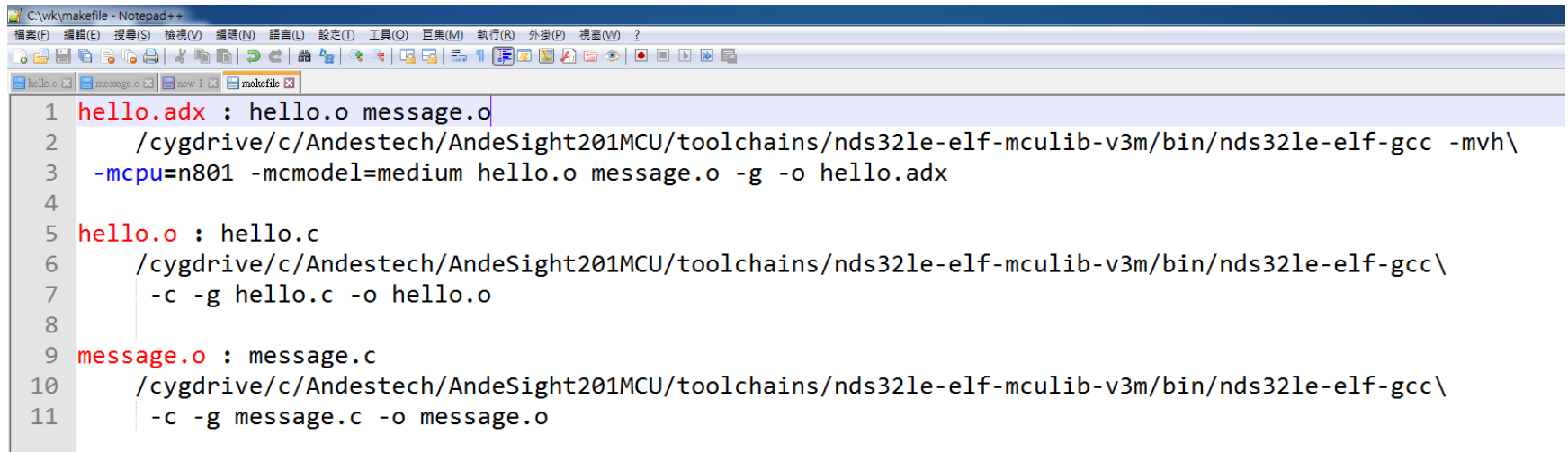
```
I5302@I5302-PC /cygdrive/c/wk
$ ls
hello.adx  hello.c  hello.o  makefile  message.c  message.o

I5302@I5302-PC /cygdrive/c/wk
$
```


3.刪除.o和.adx檔

```
I5302@I5302-PC /cygdrive/c/wk  
$ rm -f *.o *.adx  
  
I5302@I5302-PC /cygdrive/c/wk  
$ ls  
hello.c  makefile  message.c
```

4.makefile存檔於自建資料夾內



```
1 hello.adx : hello.o message.o
2     /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -mvh\
3     -mcpu=n801 -mcmmodel=medium hello.o message.o -g -o hello.adx
4
5 hello.o : hello.c
6     /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc\
7     -c -g hello.c -o hello.o
8
9 message.o : message.c
10    /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc\
11    -c -g message.c -o message.o
```

5.建立makefile

```
I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc\
    -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc\
    -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -mvh\
    -mcpu=n801 -mcmmodel=medium hello.o message.o -g -o hello.adx
```

6.檢視.adx檔是否已建立

```
I5302@I5302-PC /cygdrive/c/wk  
$ ls hello.adx  
hello.adx
```

7.透過家目錄執行hello.adx檔

```
I5302@I5302-PC /cygdrive/c/wk
$ $HOME
bash: /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin: is a directory

I5302@I5302-PC /cygdrive/c/wk
$ $HOME/nds32le-elf-gdb hello.adx
GNU gdb (2013-03-04) 7.3
Copyright (C) 2011 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "--host=i686-mingw32 --target=nds32le-elf".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
[info] Loading nds32-elf.gdbinit.
[info] nds32-elf.gdbinit loaded.
Reading symbols from c:\wk\hello.adx...done.
(gdb)
```

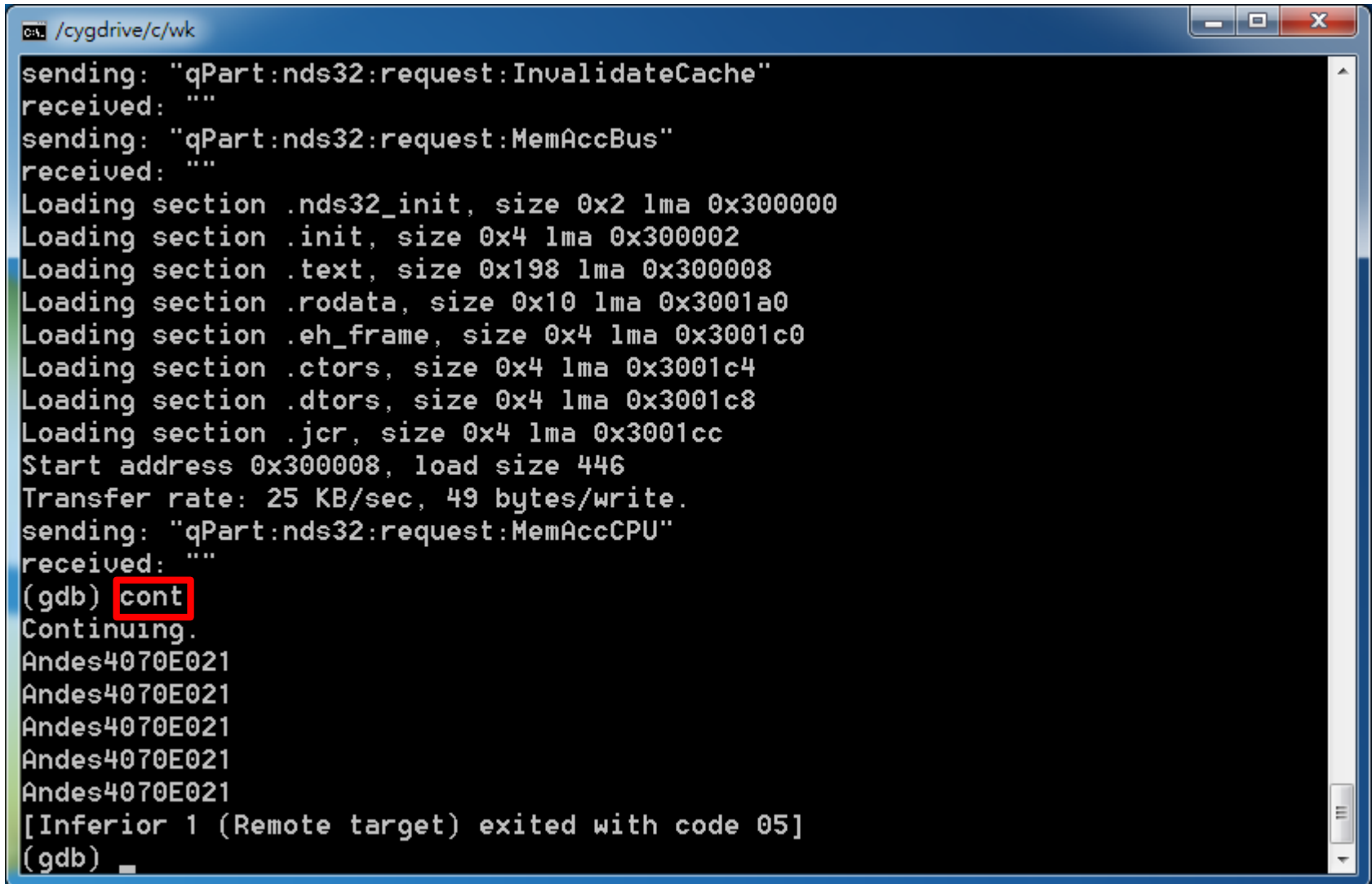
8.再次連線

```
I5302@I5302-PC /cygdrive/c/wk
$ $HOME/nds32le-elf-gdb hello.adx
GNU gdb (2013-03-04) 7.3
Copyright (C) 2011 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "--host=i686-mingw32 --target=nds32le-elf".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
[info] Loading nds32-elf.gdbinit.
[info] nds32-elf.gdbinit loaded.
Reading symbols from c:\wk\hello.adx...done.
(gdb) target remote :9898
Remote debugging using :9898
[nds32] Hook remote stopped data address for watchpoints.
0x00000000 in ?? ()
(gdb)
```

9.再次載入程式

```
C:\ /cygdrive/c/wk
[info] Loading nds32-elf.gdbinit.
[info] nds32-elf.gdbinit loaded.
Reading symbols from c:\wk\hello.adx...done.
(gdb) target remote :9898
Remote debugging using :9898
[nds32] Hook remote stopped data address for watchpoints.
0x00000000 in ?? ()
(gdb) load
sending: "qPart:nds32:request:InvalidateCache"
received: ""
sending: "qPart:nds32:request:MemAccBus"
received: ""
Loading section .nds32_init, size 0x2 lma 0x300000
Loading section .init, size 0x4 lma 0x300002
Loading section .text, size 0x198 lma 0x300008
Loading section .rodata, size 0x10 lma 0x3001a0
Loading section .eh_frame, size 0x4 lma 0x3001c0
Loading section .ctors, size 0x4 lma 0x3001c4
Loading section .dtors, size 0x4 lma 0x3001c8
Loading section .jcr, size 0x4 lma 0x3001cc
Start address 0x300008, load size 446
Transfer rate: 25 KB/sec, 49 bytes/write.
sending: "qPart:nds32:request:MemAccCPU"
received: ""
(gdb)
```

10.顯示程式結果(確定makefile是否寫對)



```
C:\ /cygdrive/c/wk
sending: "qPart:nds32:request:InvalidateCache"
received: ""
sending: "qPart:nds32:request:MemAccBus"
received: ""
Loading section .nds32_init, size 0x2 lma 0x300000
Loading section .init, size 0x4 lma 0x300002
Loading section .text, size 0x198 lma 0x300008
Loading section .rodata, size 0x10 lma 0x3001a0
Loading section .eh_frame, size 0x4 lma 0x3001c0
Loading section .ctors, size 0x4 lma 0x3001c4
Loading section .dtors, size 0x4 lma 0x3001c8
Loading section .jcr, size 0x4 lma 0x3001cc
Start address 0x300008, load size 446
Transfer rate: 25 KB/sec, 49 bytes/write.
sending: "qPart:nds32:request:MemAccCPU"
received: ""
(gdb) cont
Continuing.
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
[Inferior 1 (Remote target) exited with code 05]
(gdb) _
```

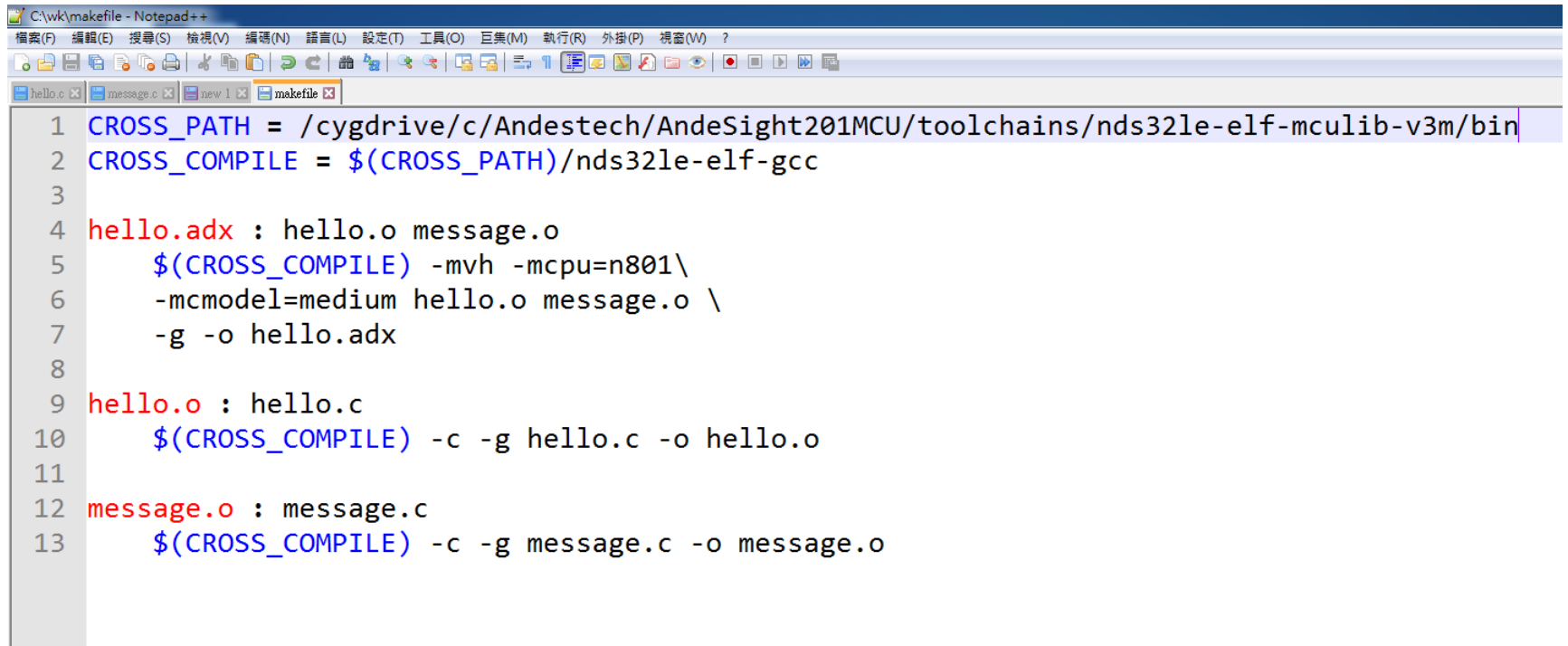

*此時(連線用)顯示結果

```

/cygdrive/c/Andestech/AndeSight201MCU/sid
I5302@I5302-PC /cygdrive/c/Andestech/AndeSight201MCU/sid
$ ./sid N801.conf
socketio: using fd 4
socketio: server at 0.0.0.0:9898
GDB init ...
socketio: accepted connection from 127.0.0.1:51593, fd 5
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
socketio: ieof1
GDB fini skipped
GDB init skipped
socketio: accepted connection from 127.0.0.1:52396, fd 5
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
socketio: ieof1
GDB fini skipped
GDB init skipped
```

makefile寫法(二)與確認無誤 (存於C槽自建資料夾內)

makefile_02



```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3
4 hello.adx : hello.o message.o
5     $(CROSS_COMPILE) -mvh -mcpu=n801\
6     -mcmmodel=medium hello.o message.o \
7     -g -o hello.adx
8
9 hello.o : hello.c
10    $(CROSS_COMPILE) -c -g hello.c -o hello.o
11
12 message.o : message.c
13    $(CROSS_COMPILE) -c -g message.c -o message.o
```

(詳細步驟說明請見投影片23-33)

```
C:\ /cygdrive/c/wk
Continuing.
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
Andes4070E021
[Inferior 1 (Remote target) exited with code 05]
(gdb) q

I5302@I5302-PC /cygdrive/c/wk
$ rm -f *.adx *.o

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile2.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -muh -mcpu=n801\
    -mmodel=medium hello.o message.o \
    -g -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$
```

```

C:\ /cygdrive/c/wk
Andes4070E021
Andes4070E021
[Inferior 1 (Remote target) exited with code 05]
(gdb) q

I5302@I5302-PC /cygdrive/c/wk
$ rm -f *.adx *.o

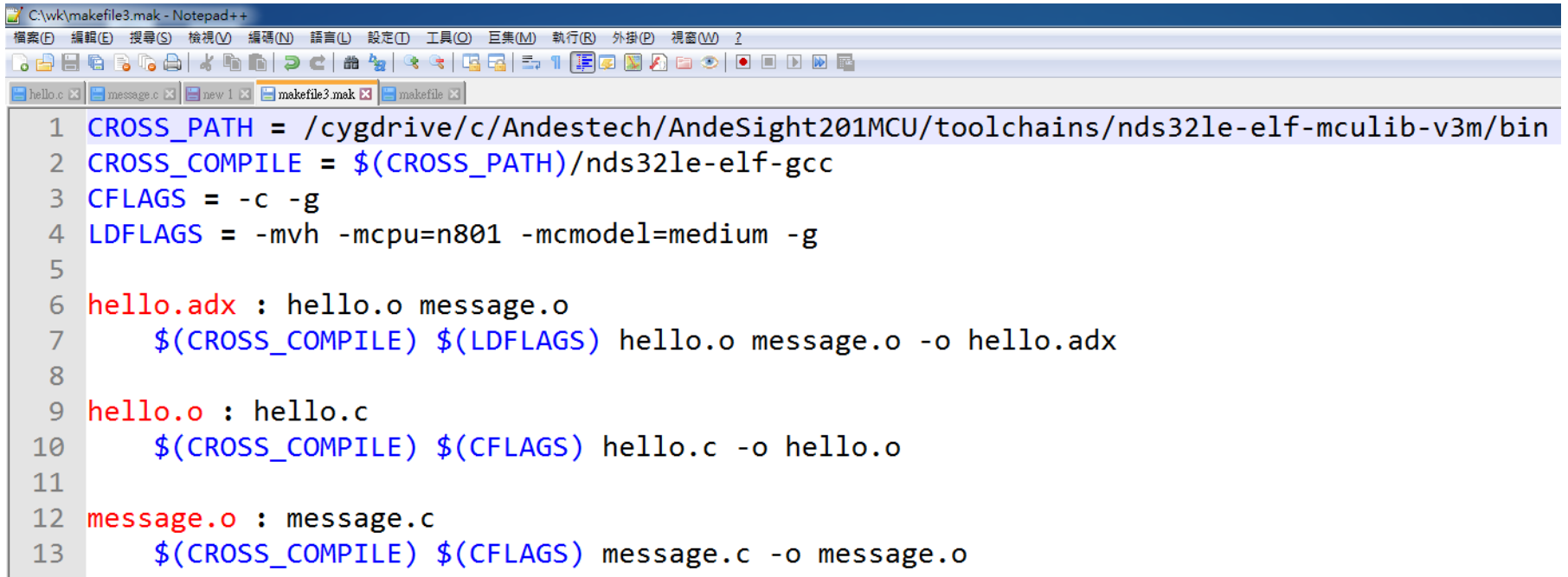
I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile2.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -muh -mcpu=n801\
    -mcmmodel=medium hello.o message.o \
    -g -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ ls hello.adx
hello.adx

I5302@I5302-PC /cygdrive/c/wk
$
```

makefile寫法(三)與確認無誤 (存於C槽自建資料夾內)

makefile_03



The image shows a screenshot of a Notepad++ window titled 'C:\wk\makefile3.mak - Notepad++'. The window contains a Makefile with the following content:

```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mcmmodel=medium -g
5
6 hello.adx : hello.o message.o
7     $(CROSS_COMPILE) $(LDFLAGS) hello.o message.o -o hello.adx
8
9 hello.o : hello.c
10    $(CROSS_COMPILE) $(CFLAGS) hello.c -o hello.o
11
12 message.o : message.c
13    $(CROSS_COMPILE) $(CFLAGS) message.c -o message.o
```

```
C:\ /cygdrive/c/wk

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile2.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -muh -mcpu=n801\
        -mcmmodel=medium hello.o message.o \
        -g -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ ls hello.adx
hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ rm *.adx *.o

I5302@I5302-PC /cygdrive/c/wk
$ ls
hello.c  makefile  makefile2.mak  makefile3.mak  message.c

I5302@I5302-PC /cygdrive/c/wk
$ _
```



```
C:\ /cygdrive/c/wk
I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile3.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -gcc hello.c -o hello.o
cc1.exe: error: unrecognised debug output level "cc"
make: *** [hello.o] Error 1

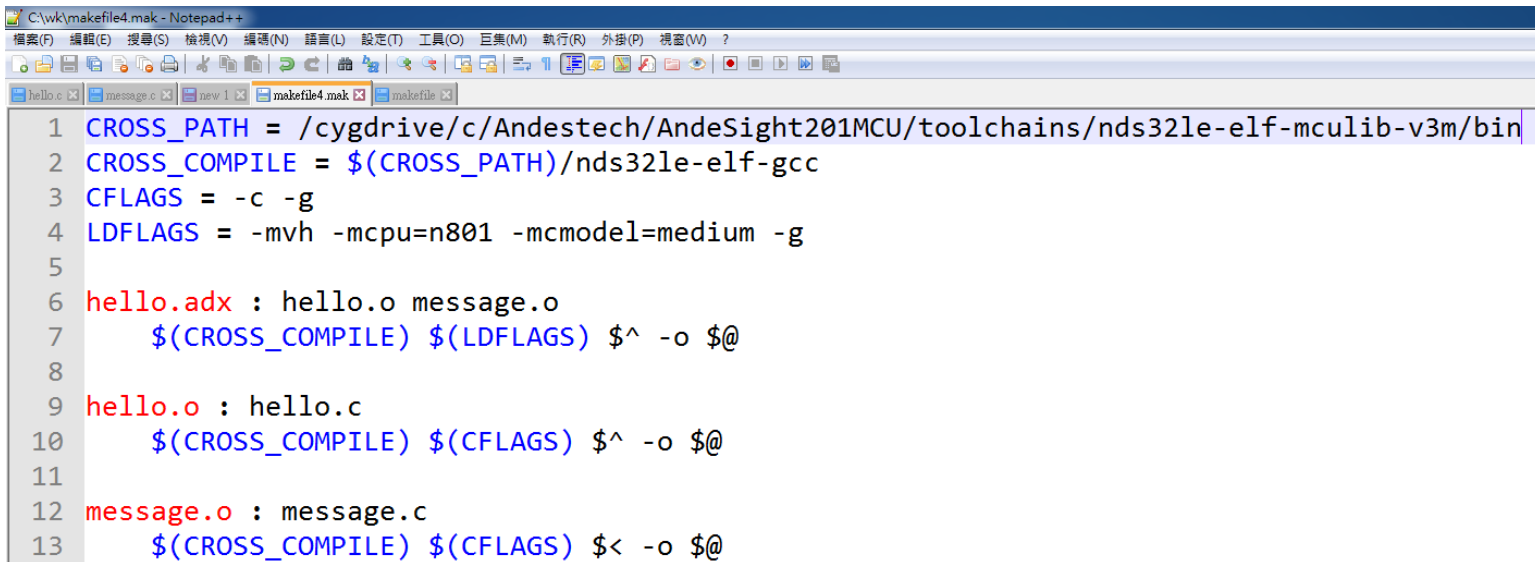
I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile3.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -gcc hello.c -o hello.o
cc1.exe: error: unrecognised debug output level "cc"
make: *** [hello.o] Error 1

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile3.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium -g hello.o message.o -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ _
```

makefile寫法(四)與確認無誤 (存於C槽自建資料夾內)

makefile_04



```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mcmmodel=medium -g
5
6 hello.adx : hello.o message.o
7     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@
8
9 hello.o : hello.c
10    $(CROSS_COMPILE) $(CFLAGS) $^ -o $@
11
12 message.o : message.c
13    $(CROSS_COMPILE) $(CFLAGS) $< -o $@
```

```
C:\ /cygdrive/c/wk
I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile3.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -gcc hello.c -o hello.o
cc1.exe: error: unrecognised debug output level "cc"
make: *** [hello.o] Error 1

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile3.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds32le-elf-gcc -muh -mcpu=n801 -mcmmodel=medium -g hello.o message.o -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ rm -f *.adx *.o

I5302@I5302-PC /cygdrive/c/wk
$ ls
hello.c  makefile  makefile2.mak  makefile3.mak  makefile4.mak  message.c

I5302@I5302-PC /cygdrive/c/wk
$ _
```

```

C:\ /cygdrive/c/wk
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium -g hello.o message.o -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ rm -f *.adx *.o

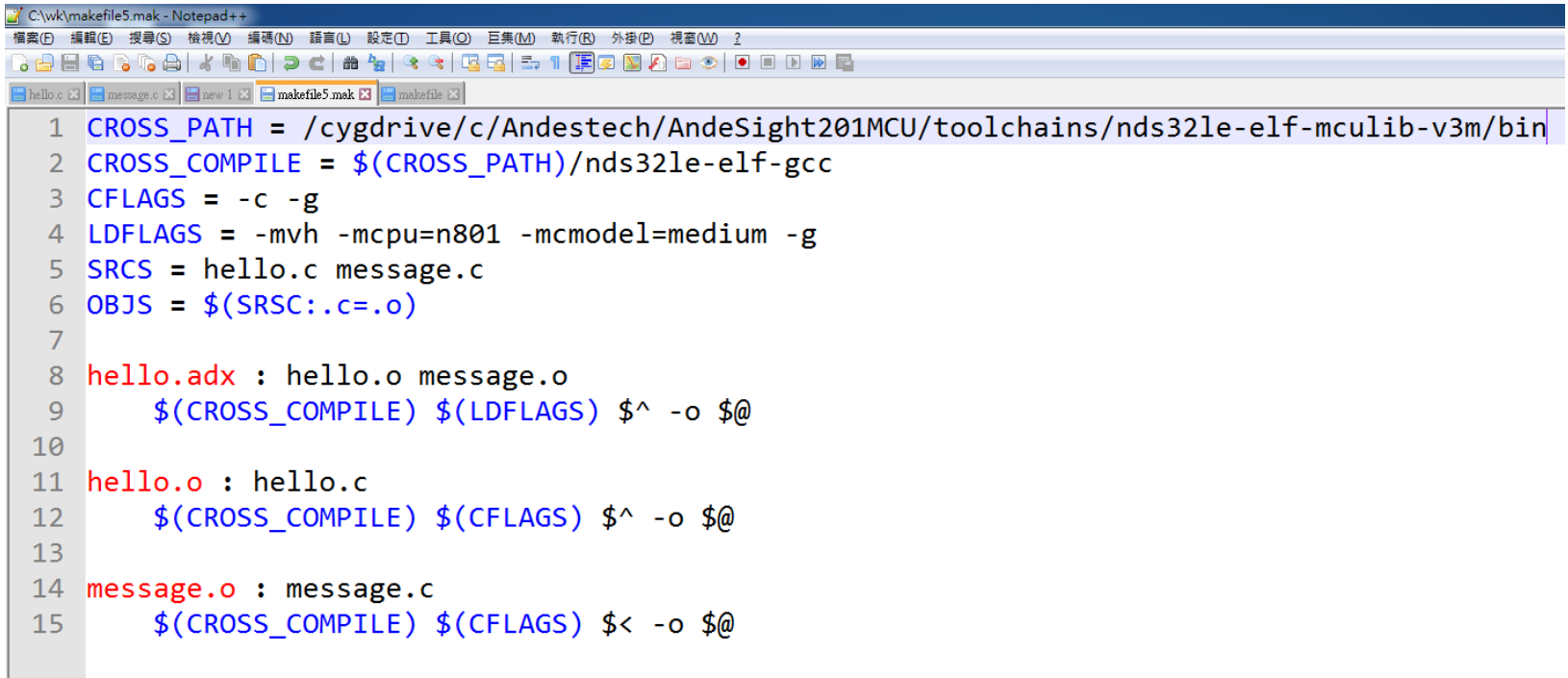
I5302@I5302-PC /cygdrive/c/wk
$ ls
hello.c  makefile  makefile2.mak  makefile3.mak  makefile4.mak  message.c

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile4.mak
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g hello.c -o hello.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g message.c -o message.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium -g hello.o message.o -o hello.adx

I5302@I5302-PC /cygdrive/c/wk
$ _
```

makefile寫法(五)與確認無誤 (存於C槽自建資料夾內)

makefile_05

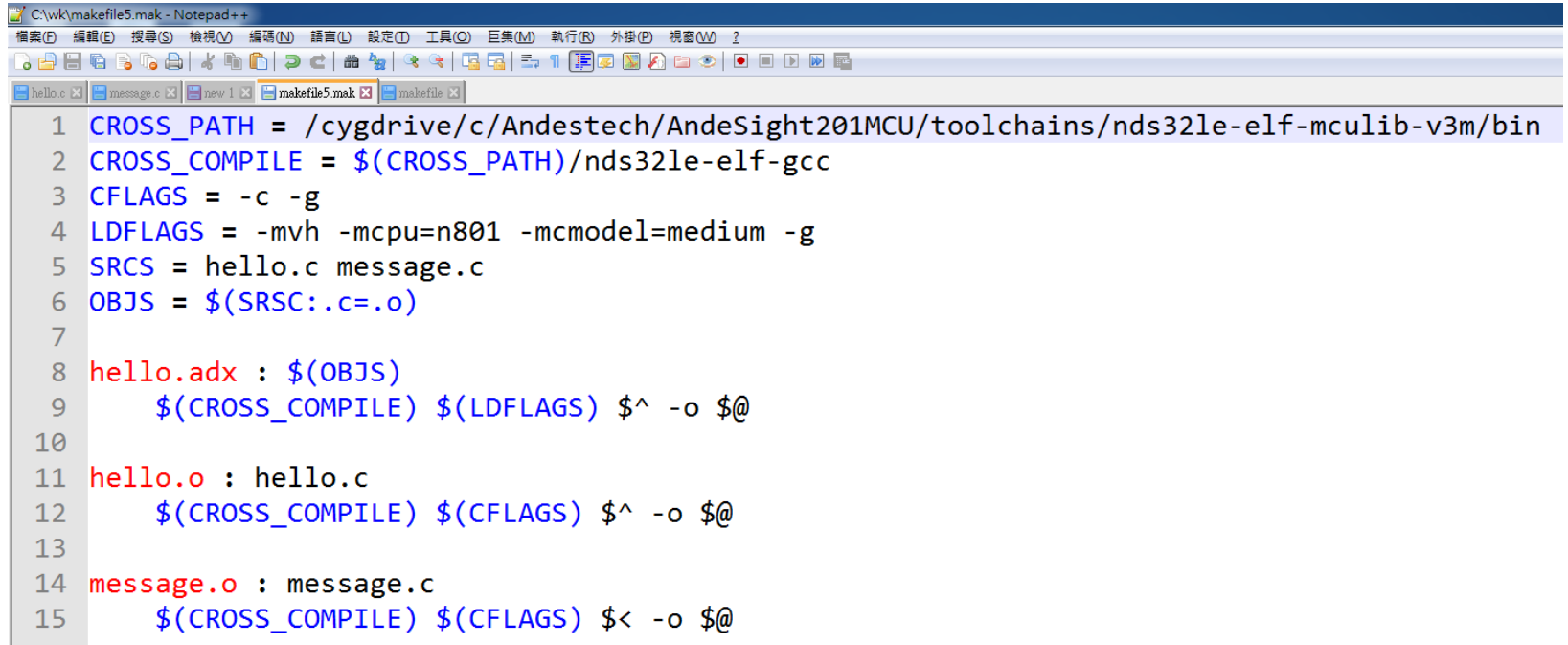


A screenshot of a Notepad++ window titled 'C:\wk\makefile5.mak - Notepad++'. The window displays a Makefile with the following content:

```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mcmmodel=medium -g
5 SRCS = hello.c message.c
6 OBJS = $(SRCS:.c=.o)
7
8 hello.adx : hello.o message.o
9     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@
10
11 hello.o : hello.c
12     $(CROSS_COMPILE) $(CFLAGS) $^ -o $@
13
14 message.o : message.c
15     $(CROSS_COMPILE) $(CFLAGS) $< -o $@
```

makefile完整寫法
(存於C槽自建資料夾內)

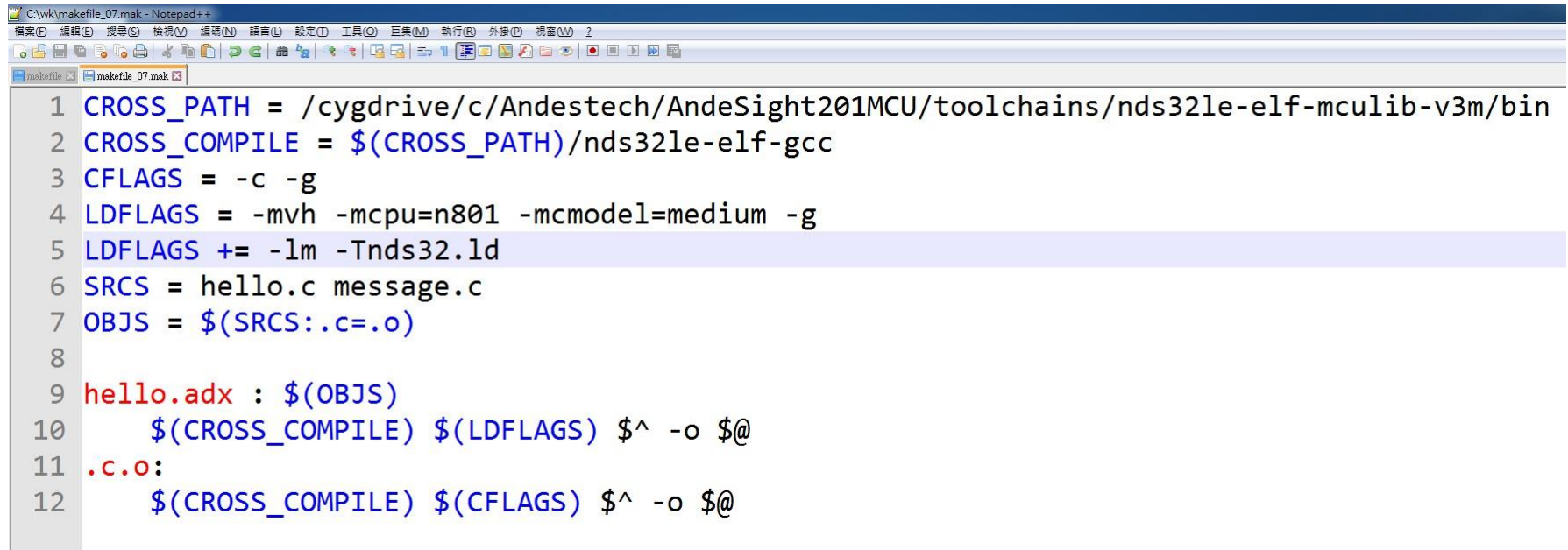
makefile_06



A screenshot of a Notepad++ window titled 'C:\wk\makefile5.mak - Notepad++'. The window displays a Makefile with the following content:

```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mcmmodel=medium -g
5 SRCS = hello.c message.c
6 OBJS = $(SRCS:.c=.o)
7
8 hello.adx : $(OBJS)
9     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@
10
11 hello.o : hello.c
12     $(CROSS_COMPILE) $(CFLAGS) $^ -o $@
13
14 message.o : message.c
15     $(CROSS_COMPILE) $(CFLAGS) $< -o $@
```

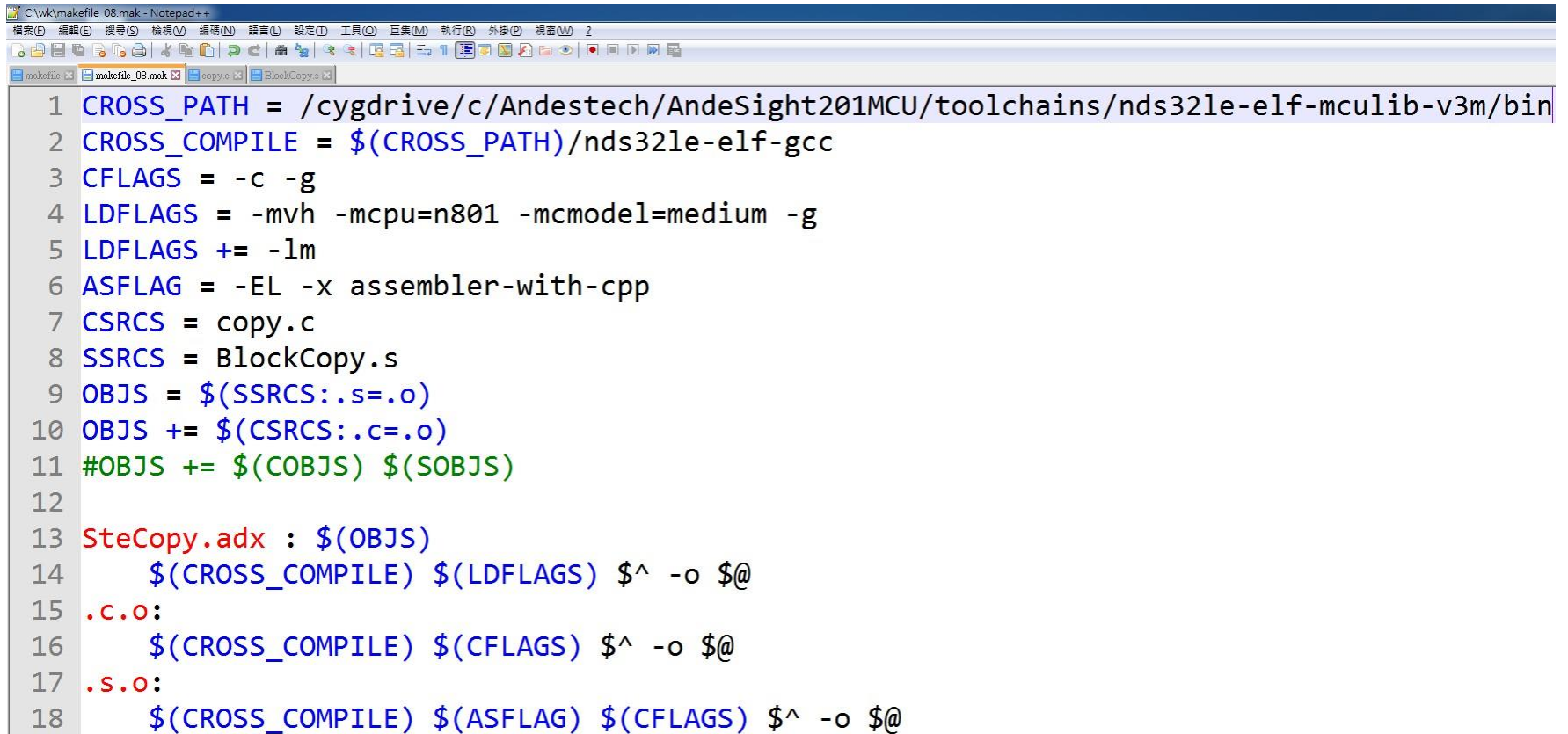
makefile_07



A screenshot of a Notepad++ window titled 'C:\wk\makefile_07.mak - Notepad++'. The window displays a Makefile with the following content:

```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mcmmodel=medium -g
5 LDFLAGS += -lm -Tnds32.ld
6 SRCS = hello.c message.c
7 OBJS = $(SRCS:.c=.o)
8
9 hello.adx : $(OBJS)
10     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@
11 .c.o:
12     $(CROSS_COMPILE) $(CFLAGS) $^ -o $@
```

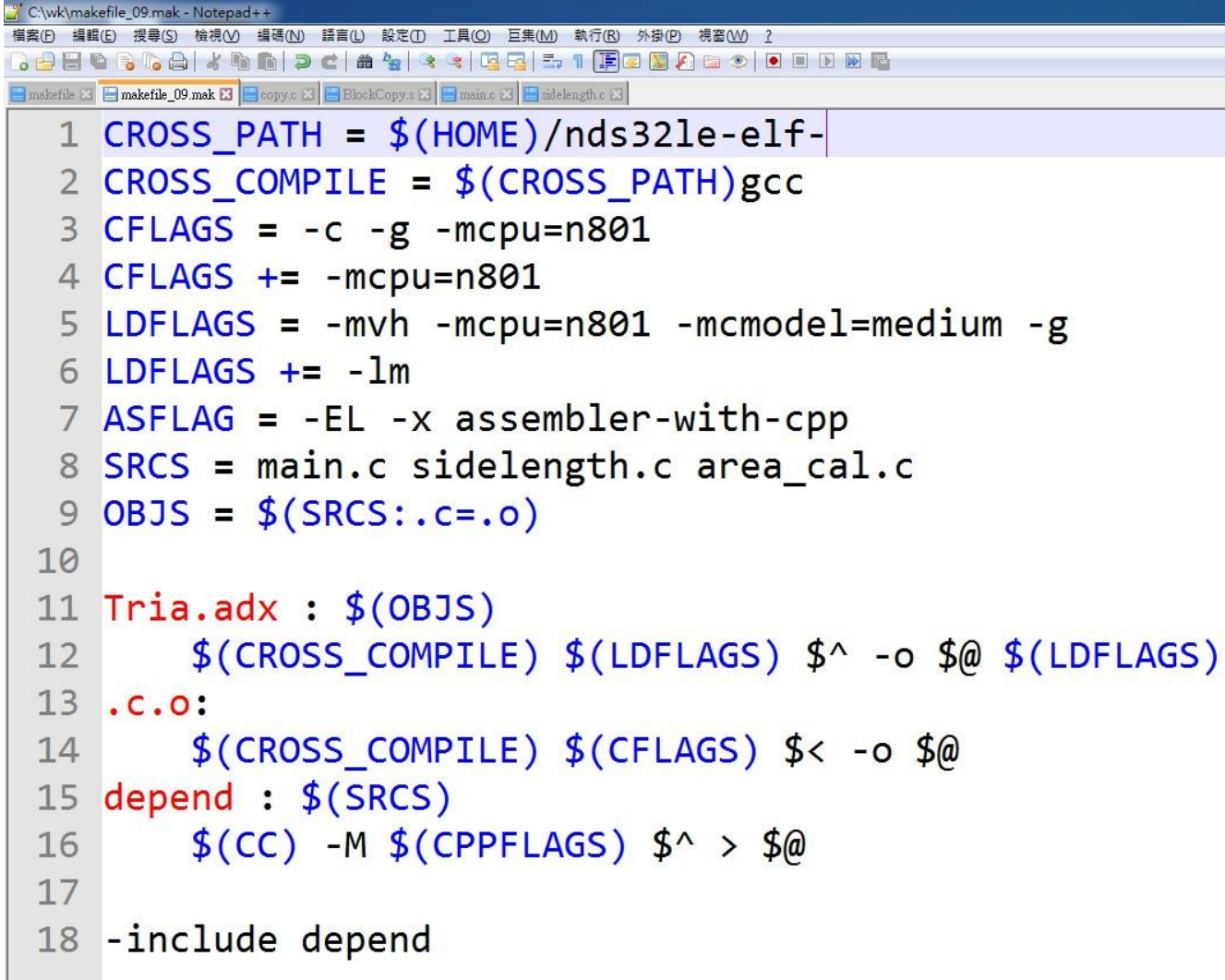
makefile_08



```
1 CROSS_PATH = /cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin
2 CROSS_COMPILE = $(CROSS_PATH)/nds32le-elf-gcc
3 CFLAGS = -c -g
4 LDFLAGS = -mvh -mcpu=n801 -mmodel=medium -g
5 LDFLAGS += -lm
6 ASFLAG = -EL -x assembler-with-cpp
7 CSRCS = copy.c
8 SSRCS = BlockCopy.s
9 OBJS = $(SSRCS:.s=.o)
10 OBJS += $(CSRCS:.c=.o)
11 #OBJS += $(COBJS) $(SOBJS)
12
13 SteCopy.adx : $(OBJS)
14     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@
15 .c.o:
16     $(CROSS_COMPILE) $(CFLAGS) $^ -o $@
17 .s.o:
18     $(CROSS_COMPILE) $(ASFLAG) $(CFLAGS) $^ -o $@
```

makefile標準簡單寫法

makefile_09



The image shows a Notepad++ window with the title bar 'C:\wk\makefile_09.mak - Notepad++'. The menu bar includes '檔案(F)', '編輯(E)', '搜尋(S)', '檢視(V)', '編碼(N)', '語言(L)', '設定(I)', '工具(O)', '巨集(M)', '執行(R)', '外掛(P)', '視窗(W)', and '?'. The toolbar contains various icons for file operations and editing. The tab bar shows 'makefile', 'makefile_09.mak', 'copy.c', 'BlockCopy.s', 'main.c', and 'sidelength.c'. The main text area contains the following Makefile content:

```
1 CROSS_PATH = $(HOME)/nds32le-elf-
2 CROSS_COMPILE = $(CROSS_PATH)gcc
3 CFLAGS = -c -g -mcpu=n801
4 CFLAGS += -mcpu=n801
5 LDFLAGS = -mvh -mcpu=n801 -mmodel=medium -g
6 LDFLAGS += -lm
7 ASFLAG = -EL -x assembler-with-cpp
8 SRCS = main.c sidelength.c area_cal.c
9 OBJS = $(SRCS:.c=.o)
10
11 Tria.adx : $(OBJS)
12     $(CROSS_COMPILE) $(LDFLAGS) $^ -o $@ $(LDFLAGS)
13 .c.o:
14     $(CROSS_COMPILE) $(CFLAGS) $< -o $@
15 depend : $(SRCS)
16     $(CC) -M $(CPPFLAGS) $^ > $@
17
18 -include depend
```

先刪除*.o與*.adx，再執行以下

```
C:\ /cygdrive/c/wk
-----+ 1 I5302      mkpasswd    425 Nov  3 09:17 makefile
-----+ 1 I5302      mkpasswd    379 Nov  3 09:44 makefile_06.mak
-----+ 1 I5302      mkpasswd    392 Nov  3 10:01 makefile_07.mak
-----+ 1 I5302      mkpasswd    497 Nov  3 10:30 makefile_08.mak
-----+ 1 I5302      mkpasswd    460 Nov  3 11:41 makefile_09.mak
-----+ 1 I5302      mkpasswd     65 Nov  3 09:16 message.c
-----+ 1 I5302      mkpasswd   6583 Oct 14 2016 nds32.ld
-----+ 1 I5302      mkpasswd     36 Dec 31 2019 side.h
-----+ 1 I5302      mkpasswd    830 Nov 17 2016 sidelength.c

I5302@I5302-PC /cygdrive/c/wk
$ make -f makefile_09.mak
cc -M main.c sidelength.c area_cal.c > depend
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g -mcpu=n801 -mcpu=n801 main.c -o main.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g -mcpu=n801 -mcpu=n801 sidelength.c -o sidelength.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -c -g -mcpu=n801 -mcpu=n801 area_cal.c -o area_cal.o
/cygdrive/c/Andestech/AndeSight201MCU/toolchains/nds32le-elf-mculib-v3m/bin/nds3
2le-elf-gcc -mvh -mcpu=n801 -mcmmodel=medium -g -lm main.o sidelength.o area_cal
.o -o Tria.adx -mvh -mcpu=n801 -mcmmodel=medium -g -lm

I5302@I5302-PC /cygdrive/c/wk
$
```