

How to run our output.s

# Tools

- aarch64-linux-gnu-gcc

(Ubuntu/Linaro 4.8.2-13ubuntu1) 4.8.2

- aarch64-linux-gnu-objdump

GNU objdump (GNU Binutils for Ubuntu) 2.24

```
compiler@compiler-VirtualBox:~/hw5_src$ ls  
hello.c main.S others output.s
```

```
compiler@compiler-VirtualBox:~/hw5_src$ cat hello.c  
int MAIN(){  
    write("Hello");  
    write("\n");  
    return 0;  
}
```

- Don't modify main.S .
- hello.c is the input file( what we want to compile).
- Run ./parser hello.c. The output.s is the output.

```
compiler@compiler-VirtualBox:~/compiler_2015/hw5_answer$ aarch64-linux-gnu-gcc -static -O0 main.S  
compiler@compiler-VirtualBox:~/compiler_2015/hw5_answer$ qemu-aarch64-static ./a.out
```

- Linking: `aarch64-linux-gnu-gcc -static -O0 main.S`
- `a.out` is the ARM-v8 executable.
- We run `a.out` through `qemu-aarch64-static`

# You can also use run.sh

- We also provide a script: run.sh to do all these instructions.

Usage:

Put the run.sh and main.S in the same directory

`./run.sh [your parser] [ the C-- file]`

The output is a a.out executable.

Ex: `./run.sh .parser ./patern/hello.c`

How to debug?

# Using GDB and QEMU

- We can run command: `aarch64-linux-gnu-objdump -d a.out > tmp.s` to dump assembly to tmp.s
- Run: `qemu-aarch64-static -g 1234 ./a.out`
- create another terminal and type the following command
- `gdb-multiarch`  
(enter gdb)
- set architecture aarch64
- target remote localhost:1234

# Some useful command for gdb

- `b *address`
- `layout asm`
- `layout regs`
- `c`
- `nexti`

Can get more information by typing `help` or google `gdb`.



```
compiler@compiler-VirtualBox: ~/hw5_src
compiler@compiler-VirtualBox:~/hw5_src$ qemu-arm-static -g 1234 ./a.out
```

```
00008b1c <_start_MAIN>:
8b1c: e58de000 str lr, [sp]
8b20: e50db004 str fp, [sp, #-4]
8b24: e24db004 sub fp, sp, #4
8b28: e24dd008 sub sp, sp, #8
8b2c: e59fe0c0 ldr lr, [pc, #192] ; 8bf4 <_end_MAIN+0x54>
8b30: e59ee000 ldr lr, [lr]
8b34: e04dd00e sub sp, sp, lr
8b38: e5
8b3c: e5
8b40: e5
8b44: e5
8b48: e5
8b4c: e5
8b50: e5
```

compiler@compiler-VirtualBox: ~

Register group: general

r0	0x1	1
r1	0xf6fff094	-150998892
r2	0xf6fff09c	-150998884
r3	0x8aec	35564
r4	0x70000	458752
r5	0x0	0

B+> 0x8b1c str lr, [sp]  
0x8b20 str r11, [sp, #-4]  
0x8b24 sub r11, sp, #4  
0x8b28 sub sp, sp, #8  
0x8b2c ldr lr, [pc, #192] ; 0x8bf4  
0x8b30 ldr lr, [lr]

remote Remote target In: Line: ?? PC: 0x8b1c

(gdb) c  
Continuing.

Breakpoint 1, 0x00008b1c in ?? ()  
(gdb) nexti