Project 1

Setting up the Development Environment, Debug, and First Program

This programming assignment is structured in mainly two parts. The first part requires you to install the development environment and assure functionality. A second part will guide you through the development of a simple program and its debugging.

The deliverables of the programming assignment are (more details below):

- Multiple screenshots of the development environment (in editor and debugging mode), for a total of four (4);
- Source code you developed.

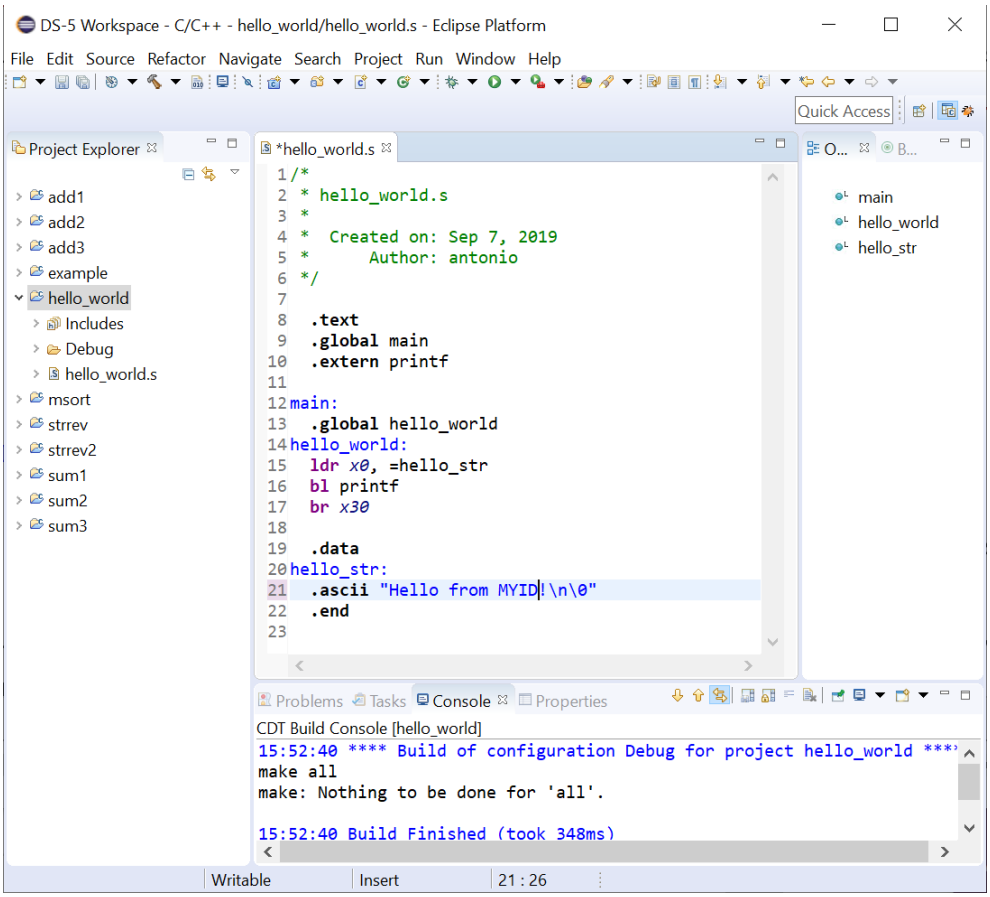
Development Environment

Setup the DS-5 development environment on your computer, or virtual machine. Your setup should include the installation of the compiler toolchain. Instructions of how to setup ARM DS-5 and the Linaro gcc toolchain have been given in class by your instructor, alternatively, instructions can be found on the website of the course.

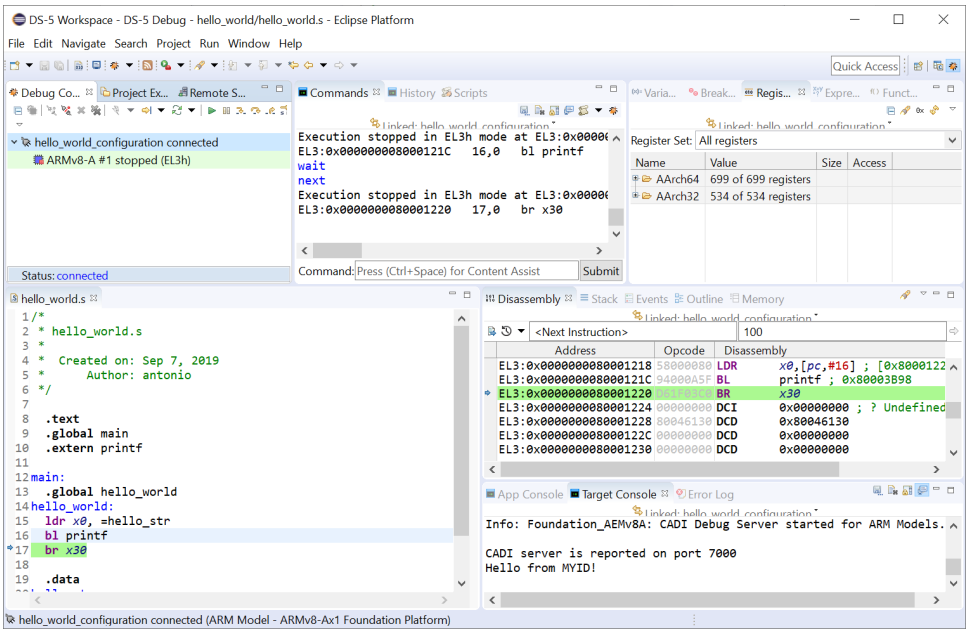
Now we are going to make sure that your installation works. Following the instructions given in class, or the instructions in the slides titled “First Assembly Program”, create a new assembly program (in DS-5). This is the code of your program, to be added into a file called **hello_world.s**:

```
  .text
  .global main
  .extern printf
main:
  ldr x0, =hello_str
  bl printf
  br x30
  .data
hello_str:
  .ascii "Hello from MYID!\n\0"
  .end
```

Where MYID is your Stevens ID, or your name and surname. Then build the project. At this point take a screenshot of the DS-5 IDE including the Console Window, similar to the screenshot below. Name the screenshot screenshot1.[jpg|png] (use either jpg or png format).



Now run the program in debugging mode. Please step through the execution and stop right after the printf call. At this point take a s screenshot, similar to the one below – the “Target Console” Tab must show your printed string. Name the screenshot screenshot2.[jpg|png], use either jpg or png format. Please mind the differences between Step Line (F5), and Step Over (F6).



First program

Given the following array of thirteen (13) 64 bit numbers.

```
array:
  1025, 3, 1234567, 8, 64, 128, 127, 126, 125, 54321, 1, 99, 100
```

Add a fourteenth (14^{th}) element to the array, which will be your Stevens ID. Now the array will have 14 elements. Array will be allocated in the data section of your program.

Write a program, starting from the function main, which goes over each element of the array and calculates the sum, which must be put in a temporary register.

If the sum is even use printf to print the following string in the console: “The sum is even”. Otherwise, please print the following string in the console: “The sum is odd”.

You need to submit your code and two screenshots. The first that demonstrate that your program can be compiled successfully (similar to screenshot1, above) and must be named screenshot3.[jpg|png] (either jpg or png format). The second screenshot must show that your program can generate the correct output in “Target Console” during debugging – this is similar to screenshot2, above. This last screenshot must be named screenshot4.[jpg|png] (either jpg or png format).

How will you be graded?

- 40% the installation is fully working, and you can compile and run in debug mode the demo program
- 40% code is commented, syntactically correct and compiles with no errors
- 20% code is fully working and you can run in debug mode

Please note that just submitting the 4 screenshots and the code doesn’t give you any point if they are not correct.