# Lab 7 Part 1: Answers

## Lab 7 Part 1 outcomes

Upload two files to Sulis:

1. Your modified ET4011\_Lab7\_Pt1.c file
2. Your Terminal output file, ET4011\_Lab7\_Pt 1.txt
3. If you have time, please also upload the file ‘ET4011 Lab 7 Answers’. See Exercises part 1 below.

Be sure to disconnect the debugger using the icon before quitting.

Exercises:

1. List the ARM v8 Assembly language instructions that implement the Hello World program, and fill in your results in ‘ET4011 Lab 7 Answers’.
2. Change the output string from ‘Hello World’ to ‘Computer Organisation Sem 1 2021’
3. Upload your files to Sulis.

Make sure you disconnect the debugger before quitting DS-5.

# Lab 7 Part 2: Answers

1. Answer the following questions (note that the register contents may be in hexadecimal):
   1. What data is in register X0?
   2. What data is in register X1?
   3. What data is in register X2?
   4. How do the register contents relate to the passed-in parameters?

|  |  |
| --- | --- |
| a | X0: 0x0000000000000004 |
| b | X1: 0x000000000000000A |
| c | X2: 0x0000000000000007 |
| d | Answer: X0 1st parameter, X1 second , X2 third |

1. Step the next instruction (add x9, x1, x2). Fill in the table again.
   1. What data is in register X0?
   2. What data is in register X1?
   3. What data is in register X2?
   4. What data is in register X9?

|  |  |
| --- | --- |
| a | X0: 0x0000000000000004 |
| b | X1; 0x000000000000000A |
| c | X2: 0x0000000000000007 |
| d | X9: 0x0000000000000011 (17) |

1. Step the next instruction (add x0, x0, x9). Fill in the table again.
   1. What data is in register X0?
   2. What data is in register X1?
   3. What data is in register X2?
   4. What data is in register X9?
   5. What data is in register x30?

|  |  |
| --- | --- |
| a | X0: 0x0000000000000015 (21) |
| b | X1: 0x000000000000000A |
| c | X2: 0x0000000000000007 |
| d | X9: 0x0000000000000011 |
| e | X30: 0x0000000080001244 |

1. Step the next instruction (br x30). Explain what has just occurred. Also, what data is register X0?

|  |  |
| --- | --- |
| Explanation | X30 stores location program returns to after completing the function |
| X0: | 0x0000000000000015 (21) |