Lab 1

Instructions

Complete each task and demonstrate the working program to your tutor. Tasks should be demonstrated using AVR Studio's simulator.

Part A – 16-bit Add (2 Marks)

Load the 16-bit numbers 40960 and 2730 into register pairs r17:r16 and r19:r18. Add them together and store the result in register pair r21:r20.

Part B – Array Addition (2 Marks)

Load the two arrays (1, 2, 3, 4, 5) and (5, 4, 3, 2, 1) into registers and add them together, storing the result in a third array in data memory. Each integer should take up one byte.

You do not need to use loops or load data from program memory for this task.

Part C – Upper Case (2 Marks)

Write a program to copy a string from program memory into RAM. The loaded string should then be converted into upper case.

You may assume the string is less than 20 characters long. The string may contain letters, numbers, spaces, and punctuation.

Part D – String Search (2 Marks)

Write a program that loads a null-terminated string stored in program memory, and searches for a specific character. Store the index of the character in r16, or store 0xFF if the character wasn't found.

Part E – Array Sort (2 Marks)

Write a program to load the array (7, 4, 5, 1, 6, 3, 2) from program memory into RAM and then sort it (using bubble sort) in ascending order.