Assembly Language Lesson Plan

Wednesday 25th January - 13B

The aim of this lesson is to go over the common constructs of Assembly including If statements, While loops, For Loops to help students understand the common patterns and how to spot them. And how to produce them.
After this lesson students should be able to:

- Convert simple assembly programs between assembly and pseudocode.
- Understand the common patterns for control flow constructs.
- Be able to use registers as “local variables”.
- Know the common types of exam questions they are likely to be asked on the topic.
- Try a hard example

10:55	**Introduction - Slides 1-4** Introduction & why we use assembly. Use of Registers + Memory Recap of Instructions
11:00	**If Statements - Slide 5** Explain structure of the general if statement: - Use of CMP. - Branch with the opposite condition to the if statement. - Use of label to make the jump If-Else: Ask for volunteer to fill out the general structure of an If-Else statement. Which they could work out from If statement. Example Question: Give students time to complete a simple example question **Slide 6** then go over the solution using GodBolt
11:10	**Loops - Slide 7** Go through the 2 general while loop examples. Ask students how we can do **Do-While** loops. (Remove first branch in while loop slide. Ask students how we could do a **for loop** using a while loop. Using a register storing i Example Questions: Give students a few mins to look at 2 example questions on **Slide 8** Then go over together**.**
11:20	**Exam Style Questions - Slide 9** Explain the types of exam question and what they’d be expected to do.

11:25	**Challenge Question - Implement a Bubble Sort in Assembly**
	- Go through a few common tips to solving the questions.
	- Ask student to verbally describe Bubble Sort Algorithm
	Bubble Sort Algorithm.
	- Show them the python code on slide - code written in a way that mirrors my solution. So essentially its a more complex translation exercise which seems to be what AQA tend to do. Although this example is much more complex than AQA have ever done.
	- Show array notation on Whiteboard.
	
	Homework?? Finishing off the bubble sort. **Check with Richard whether I should be setting homework or not.**
	
	My Solution:
	MOV R1, #6
	bsort:
	MOV R2, #0
	MOV R6, #0
	bsort_loop:
	ADD R7, R2, #2
	CMP R1, R7
	BLT bsort_check
	ADD R3, R2, #1
	LDR R4, [R2+data]
	LDR R5, [R3+data]
	CMP R4, R5
	BLT bsort_not_swap
	BEQ bsort_not_swap
	STR R5, [R2+data]
	STR R4, [R3+data]
	ADD R6, R6, #1
	bsort_not_swap:
	MOV R2, R3
	B bsort_loop
	bsort_check:
	CMP R6, #0
	BGT bsort
	bsort_done:
	HALT
	data:
	DAT 2
	DAT 47
	DAT 4
	DAT 23
	DAT 9
	DAT 11

11:45	**END** Ask students to fill in a short written survey on how they found the lesson.