

Computer Mathematics

Week 1 Quiz

1. Write the names of the six main steps in the machine (fetch-execute) cycle.

- i) _____.
- ii) _____.
- iii) _____.
- iv) _____.
- v) _____.
- vi) _____.

2. What do the following acronyms stand for?

- RAM _____.
- CPU _____.
- PC _____.
- IR _____.
- CU _____.
- GPR _____.
- ALU _____.
- PSR _____.
- USB _____.
- PCI _____.

3. Fill in the blanks...

There are _____ bytes in a 32-bit word.

There are _____ nybbles in a 64-bit word.

The _____ significant bit is at the leftmost end of the byte or word.

Bit number _____ is the least significant.

In a 64-bit word, the least significant bit of the most significant byte is numbered _____.

In a 32-bit, byte-addressable memory, the word after address 820 has the address _____.

In a 64-bit computer, a typical serial bus is _____ bits wide.

Additional challenges

4. Consider the program shown below. It finds the index of the first occurrence of a target value in an array. Assuming that there might be multiple occurrences of the target value in the array, modify the program so that it returns the *last* occurrence of the target value.

<i>label</i>	<i>operation</i>	<i>operands</i>	<i>comment</i>
	load	r1, array	load array address into register 1
	load	r2, length	load array length into register 2
	load	r3, value	load target value into register 3
	set	r0, 0	the next index to check is held in r0
next:	compare	r0, r2	check if we reached the end of the array
	jump_if_equal	fail	if so, target was not found
	load	r4, r1[r0]	fetch next element from array
	compare	r4, r3	compare it to the target value
	jump_if_equal	done	if found, return the corresponding index in r0
	add	r0, r0, 1	increment the index
	jump	next	continue searching at the next index
fail:	set	r0, -1	index -1 means 'target not found'
done:	halt		r0 contains index of target element, or -1

5. Modify the program of the previous question to return a count of how many times the target value occurs in the array.