

COM 410, 1799, Computer Architecture

Task #1, Simple Problems

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1 General Information

In this task you will need to solve several simple problems from the *Project Euler* web site in *x86* assembly in *real mode*. You have one week for this task. Solutions should be packed and sent to toksaitov.d@gmail.com before the deadline.

2 List of Problems

Problem #1

“Add all the natural numbers below one thousand that are multiples of 3 or 5.”

<http://projecteuler.net/index.php?section=problems&id=1>

Problem #7

“By listing the first six prime numbers: 2, 3, 5, 7, 11, and 13, we can see that the 6th prime is 13.

What is the 10001st prime number?”

<http://projecteuler.net/index.php?section=problems&id=7>

3 Notes

Unfortunately, it will not be possible to fit solutions for these problems into 16-bit registers. To overcome this limitation you need to use simple multi-precision arithmetic techniques described in the book *The Art of Assembly Language* by Randall Hyde (“Chapter 9: Advanced Arithmetic”).

For your task you will need to use the *adc* instruction (add with carry).

adc destination, source

Adds source + carry flag to destination.

```
1      add [result+2], ax ; Add the value in AX
2                                ; to the higher word of [result]
3
4      adc [result], word 0 ; Add 0 and the carry flag
5                                ; to the lower part of [result]
```

4 Links

Project Euler

<http://projecteuler.net>

The Art of Assembly Language, Multi-precision Addition

<http://bit.ly/asm-art-addition>

x86 Instruction Set Reference

<http://siyobik.info/index.php?module=x86>

Intel® Software Developer's Manuals

<http://www.intel.com/products/processor/manuals/>