Homework: Math for Developers

This document defines homework assignments from the "C# Basics" Course @ Software University. Please submit as homework a single **txt/doc/docx** file holding the answers of all below described problems.

Problem 1. Some Primes

Find the 24th, 101st and 251st prime number.

89, 547, 1597

Problem 2. Some Fibonacci Primes

Check if the 24th, 101st and 251st prime numbers are part of the base Fibonacci number set. What is their position?

None of them is part of the Fibonacci number set

Problem 3. Some Factorials

Find 100!, 171! and 250! Give all digits.

100! = $9.3326215444*10^{157}$ =
933262154439441526816992388562667004907159682643816214685929638952175999932299156089414639761565182862536979208272237582511852109168640000000000000000000000

171! = $1.24101807*10^{309}$ =
124101807021766782342484052410310399261660557750169318538895180361199607522169175299275197812048758557646495950167038705280988985869071076733124203221848436431047357788996854827829075454156196485215346831804429323959817369689965723590394761615227855818006117636510842880000000000000000000000000000000000000000000000000

250! = $3.23285626*10^{492}$ =
323285626090910773232081455202436847099484371767378066674794242711282374755511120948881791537102819945092850735318943292673093171280899082279103027907128192167652724018926473321804118626100683292536513367893908956993571353017504051317876007724793306540233900616482555224881943657258605739922264125483298220484913772177665064127685880715312897877767295191399084437747870258917297325515028324178732065818848206247858265980884882554880000000000000000000000000000000000000000000000000000000000000000000000000000000000

Problem 4. Calculate Hypotenuse

You are given three right angled triangles. Find the length of their hypotenuses.

1. Catheti: 3 and 4
2. Catheti: 10 and 12
3. Catheti 100 and 250

Triagle 1 – Hypotenuse is 5
Triagle 2 – Hypotenuse is 15.62
Triagle 3 – Hypotenuse is 269.26

Problem 5. Numeral System Conversions

Convert 1234_d to binary and hexadecimal numeral systems.

```
1234 / 16   = 77 (2)
77 / 16     = 4 (D)      1234d = 0x4D2
4 / 16      = 0 (4)

1234 / 2    = 617 (0)
617 / 2     = 308 (1)
308 / 2     = 154 (0)
154 / 2     =  77 (0)
77 / 2      =  38 (1)
38 / 2      =  19 (0)    1234d = 0100 1101 0010b
19 / 2      =   9 (1)
9 / 2       =   4 (1)
4 / 2       =   2 (0)
2 / 2       =   1 (0)
1 / 2       =   0 (1)
```

Convert 1100101_b to decimal and hexadecimal numeral systems.

$1100101_b = 1*2^6 + 1*2^5 + 1*2^2 + 1*2^0 = 64 + 32 + 4 + 1 = 101_d$

$0110\ 0101_b = 0x65$

Convert ABC_{hex} to decimal and binary numeral systems.

$0xABC = 1010\ 1011\ 1100_b$

$0xABC = 10*16^2 + 11*16^1 + 13*16^0 = 10*256 + 11*16 + 12*1 = 2560 + 176 + 12 =$
$= 2748_d$

Problem 6. Least Common Multiple

Find LCM(1234, 3456).

1234, 3456	2
617, 1728	2
617, 864	2
617, 432	2
617, 216	2
617, 108	2
617, 54	2
617, 27	3
617, 9	3
617, 3	3
617, 1	617
1, 1	
LCM	2132352