Project Euler

A mental feast

Blue Waters Undergraduate Petascale Education Program

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Outline

http://projecteuler.net/

- Euler Etiquette
- Appetizers - Warm Ups
- Main Course: problems to test your heavy mettle
- Dessert - Beautiful Problems, beautiful Algorithms
- Tough Nuts - for me
- If you can't solve it, then you can't solve it!

Eating Etiquette

Project Euler code of ethics

- Who are the problems aimed at?
  The intended audience include students for whom the basic curriculum is not feeding their hunger to learn, adults whose background was not primarily mathematics but had an interest in things mathematical, and professionals who want to keep their problem solving and mathematics on the edge.
- Should I show other people how to solve a problem?
  No. Project Euler is all about the journey to the answer. Please don't rob someone of their delight in hitting their head against the wall.

Appetizers

warm ups

- Problem 1: Add natural numbers below one thousand that are multiples of 3 or 5.
- Problem 3: Largest prime factor of 600851475143
- Problem 4: Largest palindrome product of two 3-digit numbers
- Problem 5: Smallest positive number evenly divisible by 1 to 20
- Problem 7: 10001st prime number?
- Problem 9: Product abc of the unique Pythagorean triplet for which a + b + c = 1000





Main Course

problems to test your heavy mettle

- Problem 66: Diophantine equation $x^2 - Dy^2 = 1$
- Problem 113: Not bouncy numbers < googol (10^{100})
- Problem 120: Maximum remainder when
  $(a-1)^n + (a+16)^n$ *is divided by* a^2
- Problem 125: Sum of all (palindromic and sum of consecutive squares) numbers less than 10^8
- Problem 164: 20 digit numbers n (without any leading 0's) with no three consecutive digits with sum greater than 9?
- Problem 205: Dice Game

Dessert

beautiful problems, beautiful algorithms

- Problem 127: Sum of c < 120000 , c part of a radical abc-hit.
- Problem 178: Pandigital step numbers less than 10^{40}
- Problem 256: Sums of Digit Factorials (I loved it and hated it)
- Problem 273: Sum of squares and squarefree numbers
- Problem 278: Linear Combinations of Semiprimes (ILIAHI)
- Problem 286: Barbara: mathematician and basketball player
- Problem 146: Investigating a Prime Pattern





Tough Nuts

for me, may not be for you

- Problem 78: number of ways coins can be put into piles.
- Problem 111: 10-digit primes with maximum number of repeated digits.
- Problem 185: Number Mind
- Problem 280: Ant and Seeds
- Problem 335: Gathering the Beans