CGS600A: Computational Tools in Cognitive Science

Assignment #2: Python 1: Programs with numbers

Max marks: 100
Due on/before:23.59, 20-Aug-2014. 14-Aug-2014

Write Python programs for the following. We have not discussed functions yet. So, each program should be just a sequence of statements (no functions) that require conditionals and loops. You will be writing more interesting programs in the coming assignments.

1. (a) Read a number and output `True` if it is a prime and `False` if it is not. A prime number is a number that has no divisors other than 1 and itself.

   (b) Read a number, say n, and output the first n primes. Note that the first prime is 2. By convention 1 is not considered a prime.

   (c) Read a number, say n, and output the first n twin primes. Twin primes are primes with a difference of 2. For example, (3, 5), (11, 13), (17, 19), (41, 43) etc.

   Note: The conjecture that there are infinitely many twin primes is still open though it is believed to be true. Huge progress has been made in the last 5 years and the gap is down to 246 i.e. there are infinitely many pairs of primes that differ by 246. If another unproved conjecture (Elliott-Halberstam) is assumed the gap is down to 6.

   (d) Read a number, say n, and output `True` if it is perfect and `False` otherwise. A number is perfect if it is equal to the sum of all divisors except itself. For example, 6=1+2+3, 28=1+2+4+7+14.

   (e) Read a number, say n, and output the first n perfect numbers.

   (f) Read two dates where each date is read as a sequence of 3 numbers for day, month and year respectively. Output the number of days between the two dates. Include only the starting date when counting the number of days. So, 2-1-2020 and 3-1-2020 should output 1.

[15×5,25=100]