



Exploration on Numbers with Programming (E1MAT009W)

Introduction	We are living in the digital world. Mobile applications, digital certificates, files and passwords are commonly used. Their robustness is heavily based on prime numbers and their properties. We will investigate the properties and their applications via exercises and a few programming tasks.
Programme Type / Level	Numbers and Arithmetic Workshop (Level I) (Token-required)
Instructor(s)	Mr Wu Kai Chiu is a researcher in Mathematics and Computer Science. His interests include control theory, theoretical computer science, formal languages and symbolic computation. His research awards include The Best Paper in Conference Held in Cambridge and National Honourable Mentioned Thesis. He has been an organising committee member of various mathematical competitions. He was a teacher in mathematics and computer science in St. Paul's College.
Pre-requisite	The only requirement is basic computer background (using browsers).
Target Participants	<ul style="list-style-type: none">➤ P4 to P6 HKAGE student members➤ Class size: 90 <i>First-come, first-served</i> This programme is the same as “Numbers and Arithmetic Workshop (Level 1): Exploration on Numbers with Programming (MATP1412)” in 2018/19 school year.
Medium of Instruction	<ul style="list-style-type: none">❖ Online Learning: English supplemented with English Voice Over❖ Face-to-face Tutorials: English❖ Final Test: English During the tutorials, students might raise questions related to their online learning with the instructor and have discussion with other participants during the face-to-face tutorials.
Certificate	E-Certificate will be awarded to participants who have satisfactory performance in the Final Test .
Intended Learning Outcomes	Upon completion of the course, students should be able to: <ol style="list-style-type: none">1. perform Sieve of Eratosthenes to find primes;2. convert numbers among various logarithm bases;3. perform Euclidean Algorithm for finding greatest common divisor and quick modular exponentiation;4. compute Euler's function and prime factorization using Sage;5. create own ciphers using Sage.
Duration	No. of Hours for Online Learning : 2 hours per session, for a total of 12 hours No. of Hours for Face-to-face Tutorials : 2 hours per session, for a total of 6 hours

System Requirement

Browser: IE 8 or later / Firefox 6 or later / Safari / Google Chrome;
Display resolution: 1024 x 768

This is an online course where the hosting platform is arranged with cloud service providers. Students are reminded the necessity of a stable internet connection for studying course materials.

Application Deadline

~~3 May 2021, 12:00 n.n~~
~~24 May 2021, 12:00 n.n~~
7 Jun 2021, 12:00 n.n
First-come, First-served

Student members may withdraw from the programme on or before the deadline. Otherwise, the token will be deducted.

Schedule

Session	Lesson	Date	Time	Venue (HKAGE)
1	Online Learning of Module 1.1 (edX platform)	19 Jun - 25 Jun	N.A.	N.A.
2	Online Learning of Module 1.2 (edX platform)	26 Jun - 2 Jul	N.A.	N.A.
3	Face-to-face Tutorial (Optional)	3 Jul	10:00 a.m. -12:00n.n.	Room 105
4	Online Learning of Module 1.3 (edX platform)	3 Jul - 9 Jul	N.A.	N.A.
5	Online Learning of Module 1.4 (edX platform)	10 Jul -16Jul	N.A.	N.A.
6	Face-to-face Tutorial (Optional)	17 Jul	10:00 a.m. -12:00n.n.	Room 105
7	Online Learning of Module 1.5 (edX platform)	17 Jul - 23 Jul	N.A.	N.A.
8	Online Learning of Module 1.6 (edX platform)	24 Jul - 30 Jul	N.A.	N.A.
9	Face-to-face Tutorial (Optional)	31 Jul	10:00 a.m. -12:00n.n.	Room 105
10	Final Test (Compulsory)	7 Aug	2:00 p.m. -4:00 p.m.	Room 105

Remarks:

- The three face-to-face tutorials will not be counted in the calculation of attendance. E-Certificate will be awarded to participants who have attended the final assessment on 7 Aug 2021 with satisfactory performance.**
- An email will be sent to the participants in due course to create an account on edX in order to access the learning materials.

Sample Notes

Consider the equation $MATHS \cdot 7 = POISON$.

- All alphabets represent distinct digits
- The 5-digit number MATHS is a prime.

Find all possible values of MATHS.

Enquiries

For enquiries, please contact Academic Programme Development Division at 3940 0101 after language selection, press "1".