Programming for A level Computing through automated cipher breaking

This is a two-day course that will give teachers the skill and confidence to teach programming at A level.

This is a practical, hands-on programming CPD course aimed at teachers who are already comfortable at teaching programming at GCSE. The course will extend and develop your programming skills, showing you how to use the advanced techniques required at A level to solve complex problems.

By the end of the course, you will have developed expertise in:

* Creation and use of complex data structures (multi-dimensional arrays, dictionaries, advanced string handling).
* Problem, data, and program abstraction, decomposition, and composition.
* Use of subroutines for decomposition and information hiding.
* Use of nested control structures.
* Iterative, recursive, and parallel strategies for solving problems.
* Basic object-oriented programming strategies.
* Text file handling.
* Using complexity analysis to compare algorithms.

Taking inspiration from the work of Alan Turing at Bletchley Park, the course uses the task of automatic cipher breaking to illustrate and develop these programming techniques. The course will cover four main ciphers (Caesar cipher, keyword-based substitution cipher, column transposition cipher, and Pocket Enigma). Participants will implement enciphering, deciphering, and automatic breaking of these ciphers.

2 days full time

Uses Python 3.4