**Week 1 - Basics of Coding And Math**

**Goals**  
By the end of this week, students should have their language of choice for the program and for the interviews selected, and should be comfortable writing basic code in that language, as well as handle arrays, basic mathematics, simple bitwise operations, and simple string manipulation with ease and comfortably.  
Bonus: Learn how to implement union-find data structure and solve problems using it.

**Topics**  
Arrays  
Basic math  
Simple string manipulation  
Simple bitwise manipulation  
Space and time complexity analysis basics, becoming comfortable with big-O analysis  
Union find

**Reading and videos**  
[https://www.learnpython.org/](https://slack-redir.net/link?url=https%3A%2F%2Fwww.learnpython.org%2F)  
[https://developers.google.com/edu/python/strings](https://slack-redir.net/link?url=https%3A%2F%2Fdevelopers.google.com%2Fedu%2Fpython%2Fstrings)  
[https://developers.google.com/edu/python/lists](https://slack-redir.net/link?url=https%3A%2F%2Fdevelopers.google.com%2Fedu%2Fpython%2Flists)  
[https://www.khanacademy.org/computing/computer-science/cryptography/modarithmetic/a/what-is-modular-arithmetic](https://slack-redir.net/link?url=https%3A%2F%2Fwww.khanacademy.org%2Fcomputing%2Fcomputer-science%2Fcryptography%2Fmodarithmetic%2Fa%2Fwhat-is-modular-arithmetic)  
[https://wiki.python.org/moin/BitwiseOperators](https://slack-redir.net/link?url=https%3A%2F%2Fwiki.python.org%2Fmoin%2FBitwiseOperators)  
[https://www.geeksforgeeks.org/union-find/](https://slack-redir.net/link?url=https%3A%2F%2Fwww.geeksforgeeks.org%2Funion-find%2F)  
[https://algocoding.wordpress.com/2014/09/19/union-find-data-structure-disjoint-set-data-structure/](https://slack-redir.net/link?url=https%3A%2F%2Falgocoding.wordpress.com%2F2014%2F09%2F19%2Funion-find-data-structure-disjoint-set-data-structure%2F)  
[https://algocoding.wordpress.com/2014/09/25/union-find-data-structure-disjoint-set-data-structure-part-2/](https://slack-redir.net/link?url=https%3A%2F%2Falgocoding.wordpress.com%2F2014%2F09%2F25%2Funion-find-data-structure-disjoint-set-data-structure-part-2%2F)

**Coding exercises**

Arrays:  
[https://leetcode.com/problems/sort-array-by-parity](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fsort-array-by-parity)  
[https://leetcode.com/problems/transpose-matrix](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Ftranspose-matrix)  
[https://leetcode.com/problems/flipping-an-image](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fflipping-an-image)

Basic math:  
[https://leetcode.com/problems/self-dividing-numbers](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fself-dividing-numbers)  
[https://leetcode.com/problems/fizz-buzz](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Ffizz-buzz)  
[https://leetcode.com/problems/plus-one](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fplus-one)  
[https://leetcode.com/problems/excel-sheet-column-number](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fexcel-sheet-column-number)  
[https://leetcode.com/problems/power-of-two](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fpower-of-two)

Simple string manipulation:  
[https://leetcode.com/problems/reverse-string](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Freverse-string)  
[https://leetcode.com/problems/detect-capital](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fdetect-capital)  
[https://leetcode.com/problems/reverse-words-in-a-string-iii](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Freverse-words-in-a-string-iii)  
[https://leetcode.com/problems/valid-palindrome](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fvalid-palindrome)  
[https://leetcode.com/problems/reverse-vowels-of-a-string](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Freverse-vowels-of-a-string)  
[https://leetcode.com/problems/longest-common-prefix](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Flongest-common-prefix)

Simple bitwise manipulation:  
[https://leetcode.com/problems/number-complement](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fnumber-complement)  
[https://leetcode.com/problems/hamming-distance/](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fhamming-distance%2F)  
[https://leetcode.com/problems/binary-gap](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fbinary-gap)  
[https://leetcode.com/problems/single-number](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fsingle-number)  
Hashmaps and sets:  
[https://leetcode.com/problems/two-sum/](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Ftwo-sum%2F)  
[https://leetcode.com/problems/valid-anagram/](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fvalid-anagram%2F)  
Union find:  
[https://leetcode.com/problems/friend-circles](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Ffriend-circles)  
[https://leetcode.com/problems/number-of-islands](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fnumber-of-islands)  
[https://leetcode.com/problems/surrounded-regions](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Fproblems%2Fsurrounded-regions)

You can also clone this list -> [https://leetcode.com/list/xvjpt0bg](https://slack-redir.net/link?url=https%3A%2F%2Fleetcode.com%2Flist%2Fxvjpt0bg) into your leetcode profile. You will automatically have all these problems on your profile once you do clone it.