**Level 1: Simple substitution Cypher**

Use this resource to answer the following questions.

<http://practicalcryptography.com/ciphers/simple-substitution-cipher/>

1. Summarize and explain the concept of a substitution cypher
   1. What does it do?

Substitution consist of every plan text character for a different text character.

* 1. How does it work?

It changes the input into any key and then translate into cypher text.

* 1. What is a “key”?

A key is used for the substitution cypher which is 26 letters

1. Provide an example of encoding a message using a substitution cypher key.

hi my name is Rohan key: wfdojzxhbsrpequgiavktcymnl

1. Provide an example of decoding a message using a substitution cypher key.

hb en qwej bv auhwq

1. Summarize and explain the concepts related how “cryptanalysis” can be used to “break” a code.
   1. How does the “frequency analysis of letters” work?
   2. How does the “frequency analysis of words” work?

**Level 2: Morse Code**

Use this resource to answer the following questions.

<http://www.newworldencyclopedia.org/entry/Morse_Code>

1. Summarize and explain the concept of Morse code
   1. What does it do?

It is used to send coded information

* 1. How does it work?

Information is encoded into a scheme used in telecommunication that encodes text as character in a sequence

* 1. What does it use instead of a “key”?

It sends coded information and the receiver on the other side has to know how to decode the Morse code. If they don’t know they won’t be able to get the information.

1. Compare the Morse code table to the “frequency of letters” analysis in Level 1 above.
   1. What is the shortest code and how does it correspond to the frequency of letters?

The shortest code is E a dot because it’s the most used letter in the alphabet.

* 1. What is the longest code and how does it correspond to the frequency of letters?

The longest code is J and Q they have 3 dashes and a dot they are the least used letters in the alphabet.

* 1. What is the benefit of having a variable length code for letters?

By the sound you can tell what letter it is and they all have a different sound from each other

1. Provide an example of encoding a message using Morse code.

… .. -- -.-- -. .- -- . .. … .-. --- …. .- -.

1. Provide an example of decoding a message using Morse code.

Hi my name is Rohan

**Level 3: Encryption**

Use this resource to answer the following questions.

<https://computer.howstuffworks.com/encryption.htm>

1. Summarize and explain the concept of Symmetric-key Encryption. (See Slide 3)
   1. How is it similar to a “substitution cypher”?
   2. How is it different from a “substitution cypher”?
2. Encryption key strength is related to the number of bits and combinations. (See Slide 3)
   1. What is DES and how strong is it?
   2. What is AES and how strong is it?
3. Summarize and explain the concept of Public-key Encryption. (See Slide 4)
   1. How is it different from Symmetric-key Encryption
   2. What is an Asymmetric-Key?
4. Prime Numbers and Hashing Algorithms are used to encrypt messages. (See Slide 6)
   1. What is a Hash Value?
   2. How is a Hash Value used to encrypt a message?
   3. How is a Hash Value used to decrypt a message?
   4. How strong are current Public Keys (Hash Values) in terms of bits and combinations?
5. We use encryption every day when we use the internet and the following services. (See Slides 4 & 5)
   1. What is PGP?
   2. What is SSL / HTTPS?
   3. What is a Digital Certificate?
   4. What is a Certificate Authority?