STEM from Home

Information Technology

Learning to Code

In this era of information technology and computing, anyone with even a slight interest in the world of computers must have come across the word 'coding'. Coding involves writing instructions (codes) for creating a software program that solves any problem, be it an application, website, or game.

Most of you must be aware that computers understand strings of ones and zeroes known as the binary language. In order to make a computer work as per our instructions, we need to speak in its own language. Coding is basically the task of translation from human language to a language that computers or electronic machines understand. The person responsible of carrying out this task is called a coder. As computer technology has become very important, the number of opportunities in this field as a coder continues to grow.

In order to become a coder, you need to be able to write code in at least one or more programming languages such as Python, C or Java. With knowledge of coding in any of the programming languages, you are able to write code, providing necessary information to the computer to make it work according to your instructions.

A simple text editor and a compiler or interpreter would suffice for the purpose of coding. Visit the following link to know more about interpreter and compiler.

https://www.geeksforgeeks.org/language-processors-assembler-compiler-and-interpreter/

Today we are going to learn some coding concepts by writing few lines of code in a popular programming language called Python. While writing the code, we shall also learn to solve a real-world problem of encryption and decryption.

Encryption is converting normal message into a secret message that no one is able to understand except the person to whom it is sent. While decryption is the process of converting this secret message into its original form.
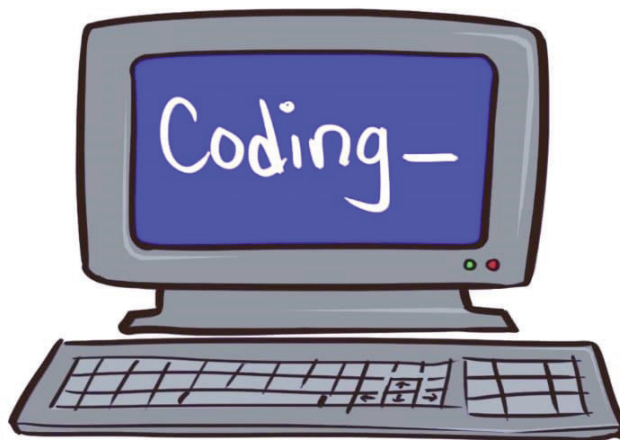
"Learning to code is useful no matter what your career ambitions are."

—*Arianna Huffington, Founder, The Huffington Post*

Main Activity: **Learn to Code – Encrypting a Message**

Introduction

In this activity you will develop a program in Python that will convert a simple meaningful message into something that cannot be understood.

What You Will Need

1. A computer connected with high-speed internet

2. A modern browser like Microsoft Edge or Google Chrome

3. An account at trinket.io

To understand how to start working on trinket.io, go through the Getting Started with Trinket document.

What You Will Learn

- How to use trinket.io for coding and testing the programs

- Basics concepts and constructs of coding in Python like:

  ‣ Defining variables

  ‣ Using assignment, incremental assignment, and modulo operators

  ‣ Accepting user inputs

  ‣ Using programming constructs like 'for' loops and 'if-then-else' statements

  ‣ Displaying outputs

Visit the following links to get more clarity on incremental assignment and modulo operators.

The Python Modulo Operator

Python += Operator

Getting Started

You can access guidelines for the activity here.

Access the completed activity by clicking here.

Bonus Activities

Activity 1: Learn to Code – Decrypting a Message

Introduction

You have learnt the basic concepts of coding and have written a code to encrypt a message. Suppose you send some encrypted messages to your friend. He receives your message, and is able to read it, but unable to understand the meaning of it. Why? Because he does not have a program that can decrypt it. Your task in this activity is to develop a program for your friend so that he can decrypt your message.

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What You Will Need

- A computer connected with high-speed internet

- A modern browser like Microsoft Edge or Google Chrome

- An account at trinket.io

What You Will Learn

How to reuse and modify the coding modules

Getting Started

Access detailed guidelines for the activity here.

Challenge Activity: Learn to Code – Enhance the Encryption Level

Your task in this activity is to make changes in the encryption code to enhance encryption level so that it is more difficult for an unauthorised person to decode your message.

Test your code for encryption by typing a message which has more than two words. Provide a key and encrypt it.

Note down the original message, key, and the encrypted message.

You will observe that all the letters of the original message have been replaced with different letters. But the spaces are as it is. There is no encryption for the spaces. E.g., if the original message is *"i am a coder"*, key is 2, then the result of encryption should be *"k co c eqfgt"*.

Make the necessary modification in the code so that it replaces the spaces in the message with a specific character. For example, it the original message is *"i am a coder"*, key is 2, then the result of encryption should be *"k*co* c*eqfgt"*.

Work independently.

Best of luck!