HyperionDev

Capstone Project – Cyphers

Task

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Introduction

This project will consolidate the knowledge that you've gained across various tasks. In this project, you will be creating a way to encode messages. Remember, it is worth putting some extra time and effort into this project – it can become part of your developer portfolio.

Developer portfolio

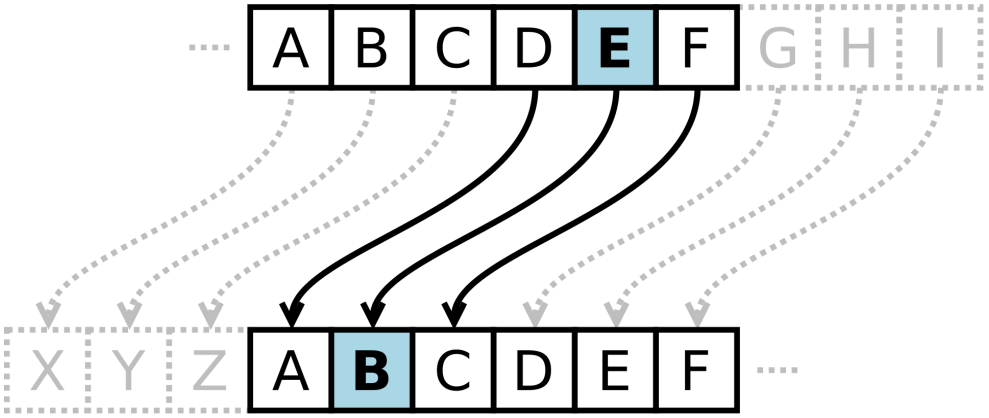
Developers who have the edge are those who find ways to apply their newfound skills from the get-go. Your **developer portfolio** (a collection of software that you have made) allows you to demonstrate your skills rather than just telling people about them. It's a way of bringing your CV to life and introducing yourself to the world. As you learn more skills and put these into practice, each project that you complete will become more efficient and eye-catching.

This task offers you the opportunity to create your first encryption project for your developer portfolio, allowing you to walk away from this course not only with a certificate but, more importantly, with a head start in your career!

The task at hand

In this task, you are going to create a cypher to write up secret messages! A cypher is a way of applying a particular algorithm to encode a message. For example, if we used the numerical equivalent of each letter instead of the letter itself, we could write "Hello" as 8-5-12-12-15. You can read more about cyphers **here**.

In this task, you will be creating a type of Caesar cypher. This is where you use an algorithm to make one letter represent another letter. Have a look at the image below:



Caesar Cypher

In this image, you can see that the letters are shifted left by three. So “DEF” would be coded as “ABC”. You can read more about Caesar cyphers **here**.

Take note

A key focus of this project will be ensuring that your code is correct, well-formatted, and readable. In this regard, make sure that you do the following before submitting your work:

1. Identify and remove all syntax, runtime, and logical errors from your code.
2. Ensure that your code is modular. Create functions to perform specific units of work.
3. Be certain that your code is readable. To ensure this, add comments to your code, use descriptive variable names, and make good use of white space and indentation.
4. Create code that is as efficient as possible. How you choose to write code to create the solution to the specified problem is up to you. However, make sure you write your code as efficiently as possible.
5. Make all the output that your program provides to the user easy to read and understand. Labelling all data that you output (whether in text files or to the screen) is essential to make the data your program produces more user-friendly. For instance, compare the readability of the outputs in the images below. Notice how using spacing and labelling the output makes the second output much more user-friendly than the first:

Output 1:

```
Assign initial tasks, admin, 10 Oct 2019, 25 Oct 2019, No, Use taskManager.py to
assign appropriate tasks to each team member
```

Versus Output 2:

```
_____________________________________________

Task:              Assign initial tasks

Assigned to:               admin

Date assigned:             10 Oct 2019

Due date:                  25 Oct 2019

Task complete?             No

Task description:  Use taskManager.py to assign appropriate tasks to each team
member

_____________________________________________
```

Practical task

Follow these steps:

1. Create a Python file called **cypher.py.**
2. Your cypher is going to use the 15th letter after the letter you want to use. For example, ‘a’ will be ‘p’. Bear in mind that the letters are treated as cyclical. That means that ‘p’ will be coded to ‘e’ (the tenth letter after ‘p’ is ‘z’, so five letters after that will be ‘e’ because the cycle starts again).
3. Create a function that will encode any message you give it.
4. Print out the encoded message.

   A few things to note:

   - You may not simply create an array of the alphabet!

- You may need to do some research on how to turn a letter into a number. **Hint: Search for ASCII values.**
- Be aware of what happens with capital versus lowercase letters. You need to account for this.
- Spaces and punctuation marks need to stay the same when encoded. So a space will remain a space, a full stop will remain a full stop, etc.

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