

# TASK-1

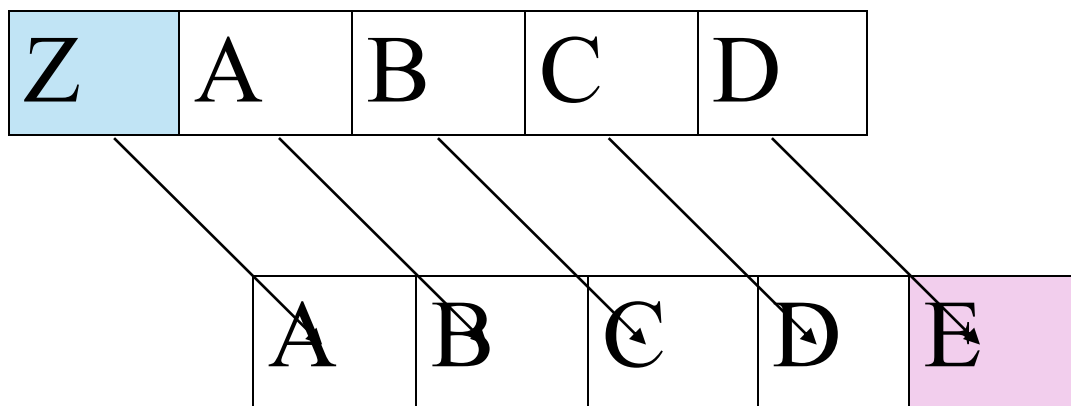
## Caesar Cipher Program

### Implement Caesar Cipher:

Create a Python program that can encrypt and decrypt text using the Caesar Cipher algorithm. Allow users to input a message and a shift value to perform encryption and decryption.

### What is **Caesar Cipher**?

This is an **encryption algorithm** that works by shifting all the letters in a message by some fixed numbers.



By applying the cipher with a shift of 1

“CAB” → “**DBC**”

Actually, we have binary numbers representation of each alphabet (ASCII codes)

Let us assume, A=65 & B=66 this is universally accepted standard

A → 65 → 72 → H

### Convert & Shifting

Here, we use python to convert each letter in our message to ASCII code number, then by shifting it by adding the shift number & we'll convert that result number back into a letter

So, by doing to all letters in our message then we'll end up with an encrypted message.

ASCII table which we use to see the binary number of the letter & identifying.

## ASCII Table

| Dec | Hex | Oct | Char | Dec | Hex | Oct | Char    | Dec | Hex | Oct | Char | Dec | Hex | Oct | Char |
|-----|-----|-----|------|-----|-----|-----|---------|-----|-----|-----|------|-----|-----|-----|------|
| 0   | 0   | 0   |      | 32  | 20  | 40  | [space] | 64  | 40  | 100 | @    | 96  | 60  | 140 | `    |
| 1   | 1   | 1   |      | 33  | 21  | 41  | !       | 65  | 41  | 101 | A    | 97  | 61  | 141 | a    |
| 2   | 2   | 2   |      | 34  | 22  | 42  | "       | 66  | 42  | 102 | B    | 98  | 62  | 142 | b    |
| 3   | 3   | 3   |      | 35  | 23  | 43  | #       | 67  | 43  | 103 | C    | 99  | 63  | 143 | c    |
| 4   | 4   | 4   |      | 36  | 24  | 44  | \$      | 68  | 44  | 104 | D    | 100 | 64  | 144 | d    |
| 5   | 5   | 5   |      | 37  | 25  | 45  | %       | 69  | 45  | 105 | E    | 101 | 65  | 145 | e    |
| 6   | 6   | 6   |      | 38  | 26  | 46  | &       | 70  | 46  | 106 | F    | 102 | 66  | 146 | f    |
| 7   | 7   | 7   |      | 39  | 27  | 47  | '       | 71  | 47  | 107 | G    | 103 | 67  | 147 | g    |
| 8   | 8   | 10  |      | 40  | 28  | 50  | (       | 72  | 48  | 110 | H    | 104 | 68  | 150 | h    |
| 9   | 9   | 11  |      | 41  | 29  | 51  | )       | 73  | 49  | 111 | I    | 105 | 69  | 151 | i    |
| 10  | A   | 12  |      | 42  | 2A  | 52  | *       | 74  | 4A  | 112 | J    | 106 | 6A  | 152 | j    |
| 11  | B   | 13  |      | 43  | 2B  | 53  | +       | 75  | 4B  | 113 | K    | 107 | 6B  | 153 | k    |
| 12  | C   | 14  |      | 44  | 2C  | 54  | ,       | 76  | 4C  | 114 | L    | 108 | 6C  | 154 | l    |
| 13  | D   | 15  |      | 45  | 2D  | 55  | -       | 77  | 4D  | 115 | M    | 109 | 6D  | 155 | m    |
| 14  | E   | 16  |      | 46  | 2E  | 56  | .       | 78  | 4E  | 116 | N    | 110 | 6E  | 156 | n    |
| 15  | F   | 17  |      | 47  | 2F  | 57  | /       | 79  | 4F  | 117 | O    | 111 | 6F  | 157 | o    |
| 16  | 10  | 20  |      | 48  | 30  | 60  | 0       | 80  | 50  | 120 | P    | 112 | 70  | 160 | p    |
| 17  | 11  | 21  |      | 49  | 31  | 61  | 1       | 81  | 51  | 121 | Q    | 113 | 71  | 161 | q    |
| 18  | 12  | 22  |      | 50  | 32  | 62  | 2       | 82  | 52  | 122 | R    | 114 | 72  | 162 | r    |
| 19  | 13  | 23  |      | 51  | 33  | 63  | 3       | 83  | 53  | 123 | S    | 115 | 73  | 163 | s    |
| 20  | 14  | 24  |      | 52  | 34  | 64  | 4       | 84  | 54  | 124 | T    | 116 | 74  | 164 | t    |
| 21  | 15  | 25  |      | 53  | 35  | 65  | 5       | 85  | 55  | 125 | U    | 117 | 75  | 165 | u    |
| 22  | 16  | 26  |      | 54  | 36  | 66  | 6       | 86  | 56  | 126 | V    | 118 | 76  | 166 | v    |
| 23  | 17  | 27  |      | 55  | 37  | 67  | 7       | 87  | 57  | 127 | W    | 119 | 77  | 167 | w    |
| 24  | 18  | 30  |      | 56  | 38  | 70  | 8       | 88  | 58  | 130 | X    | 120 | 78  | 170 | x    |
| 25  | 19  | 31  |      | 57  | 39  | 71  | 9       | 89  | 59  | 131 | Y    | 121 | 79  | 171 | y    |
| 26  | 1A  | 32  |      | 58  | 3A  | 72  | :       | 90  | 5A  | 132 | Z    | 122 | 7A  | 172 | z    |
| 27  | 1B  | 33  |      | 59  | 3B  | 73  | ;       | 91  | 5B  | 133 | [    | 123 | 7B  | 173 | {    |
| 28  | 1C  | 34  |      | 60  | 3C  | 74  | <       | 92  | 5C  | 134 | \    | 124 | 7C  | 174 |      |
| 29  | 1D  | 35  |      | 61  | 3D  | 75  | =       | 93  | 5D  | 135 | ]    | 125 | 7D  | 175 | }    |
| 30  | 1E  | 36  |      | 62  | 3E  | 76  | >       | 94  | 5E  | 136 | ^    | 126 | 7E  | 176 | ~    |
| 31  | 1F  | 37  |      | 63  | 3F  | 77  | ?       | 95  | 5F  | 137 | _    | 127 | 7F  | 177 |      |

We are going through different Phases in the project

## **Phase1:**

Printing original char code & Caesar cipher shifted char code

We print statement to the letters,

We get ASCII number or Unicode numbers or code character & now,

We have char code,

We can just add the number shift to that char code & we'll get new char code (encrypted)

## **Phase 2:**

We can see whole transform (shift) of the char

## **Phase 3:**

Finally, to get full result of our encryption we need to add all of this char back together to form descriptive message

For this,

We just create, an empty string

We can see here, adding the character & finally have the encrypted string as our output.

## **Phase 4:**

Print, out of loop (no longer loop needed)

In the output we see special char & spaces with a semi column

Now we going to fix this

Now loop ignore any char that isn't a part of the alphabet, we print them as it is.

## **Phase 5:**

We add "char. isalpha"

This statement will return a Boolean (it is a value tells either T/F)

Output: Now we can see it skips space between characters

## **Phase 6:**

In this phase,

We goanna add original char

## **Phase 7:**

We can see funky things start happening to some of my other char

So, this shift actually applying to all the lower-case letters

So, lower case char are carrying trouble

We can just convert the whole message to uppercase & then perform.  
Another python function called “upper”

## Phase 8:

Adding “last\_char\_code = 90”

Because in ASCII code, Z is 90 (last alphabet)

& add, char\_range = 26

Output: now little bit readable

## Phase 9:

I just went to encrypt a lot of diff messages at once (or) even if I want to to reverse the shift  
& use it to decrypt the messages

To do that I need to organise this code into a logical unit that I can re-use & that can has an  
interface that’s easy to understand

By putting this code into a function

“def aesar\_shift()”

It tells what arguments it accepts like, input to a function

Arguments we have message & shift

Output: there is no output because, we didn’t use the function yet!

## Phase 10:

Use the function & now also we should get the same result.

## Phase 11:

I can use it to decode a Caesar cipher

Here, we adding first char code = 65

To see the output,

Here, we change the number with ord(“”)

Because, it is to avoid looking up the table

CHAR\_RANGE = LAST\_CHAR\_CODE - FIRST\_CHAR\_CODE + 1

Add 1 because, when we do this index start with 0. So, it counts & end up being 25.

## Phase 12:

Finally, I want to interactive application & run it

I want to prompt the user to type in a message & I want to run Caesar shift on that message.

To capture user input in python, we use inbuilt function “input”.

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 for x in message:
5     print(x)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

1/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

```
a
l
p
h
a

i
n
PS C:\Users\komal\prodigy>
```

97°F Sunny

Ln 5, Col 13 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 for char in message:
5     # convert in ASCII code
6     # ORD - ordinal & it returns the unicode for char string
7     char_code = ord(char)
8
9     new_char_code = char_code + shift
10
11     print(char, char_code, new_char_code)
12
13
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

char\_code = ord(char)

1/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

```
a 97 104
l 108 115
p 112 119
h 104 111
a 97 104
 32 39
i 105 112
n 110 117
PS C:\Users\komal\prodigy>
```

97°F Sunny

Ln 13, Col 1 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 for char in message:
5     # convert in ASCII code
6     # ORD - ordinal & it returns the unicode for char string
7     char_code = ord(char)
8
9     new_char_code = char_code + shift
10
11     new_char = chr(new_char_code)
12
13     print(char, char_code, new_char_code, new_char)
14
15
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

1/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

```
a 97 104 h
l 108 115 s
p 112 119 w
h 104 111 o
a 97 104 h
 32 39 '
i 105 112 p
n 110 117 u
PS C:\Users\komal\prodigy>
```

97°F Sunny

Ln 15, Col 2 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 #result
5 result = ""
6
7 for char in message:
8     # convert in ASCII code
9     # ORD - ordinal & it returns the unicode for char string
10    char_code = ord(char)
11
12    new_char_code = char_code + shift
13
14    new_char = chr(new_char_code)
15
16    result = result + new_char
17
18    print(result)
19
20
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

1/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

```
h
hs
hsw
hsw o
hsw oh
hsw oh"
hsw oh"p
hsw oh"pu
PS C:\Users\komal\prodigy>
```

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Ln 20, Col 5 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 #result
5 result = ""
6
7 for char in message:
8     # convert in ASCII code
9     # ORD - ordinal & it returns the unicode for char string
10    char_code = ord(char)
11
12    new_char_code = char_code + shift
13
14    new_char = chr(new_char_code)
15
16    result = result + new_char
17
18 print(result)
19
20
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

powershell  
Python

> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

hswoh'pu  
PS C:\Users\komal\prodigy> python caesar\_cipher.py  
hswoh'pu  
PS C:\Users\komal\prodigy> []

Ln 20, Col 5 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 #result
5 result = ""
6
7 for char in message:
8     if char.isalpha():
9         # convert in ASCII code
10        # ORD - ordinal & it returns the unicode for char string
11        char_code = ord(char)
12
13        new_char_code = char_code + shift
14        new_char = chr(new_char_code)
15        result = result + new_char
16
17 print(result)
18
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

powershell  
Python

on3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
hswoh'pu  
PS C:\Users\komal\prodigy> python caesar\_cipher.py  
hswoh'pu  
PS C:\Users\komal\prodigy> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
hswoh'pu  
PS C:\Users\komal\prodigy> []

Ln 11, Col 30 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

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EXPLORER

PRODIGY

caesar\_cipher.py

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 #result
5 result = ""
6
7 for char in message:
8     if char.isalpha():
9         # convert in ASCII code
10        # ORD - ordinal & it returns the unicode for char string
11        char_code = ord(char)
12        new_char_code = char_code + shift
13        new_char = chr(new_char_code)
14        result = result + new_char
15    else:
16        result = result + char
17
18 print(result)
19
20
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\komal\prodigy>

> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py

hswoh pu  
PS C:\Users\komal\prodigy>

Ln 9, Col 32 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

97°F Sunny

File Edit Selection View Go Run Terminal Help prodigy

caesar\_cipher.py > ...

```
1 message = "alpha in"
2 shift = 7
3
4 #result
5 result = ""
6
7 for char in message.upper():
8     if char.isalpha():
9         # convert in ASCII code
10        # ORD - ordinal & it returns the unicode for char string
11        char_code = ord(char)
12        new_char_code = char_code + shift
13
14        if new_char_code > 90:
15            new_char_code -= 26
16
17        new_char = chr(new_char_code)
18        result += new_char
19    else:
20        result += char
21
22 print(result)
23
24
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

u  
PS C:\Users\komal\prodigy> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
hswoh pu  
python caesar\_cipher.py  
hswoh pu  
PS C:\Users\komal\prodigy> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
NYJUN V[  
PS C:\Users\komal\prodigy> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
HSDOH PU  
PS C:\Users\komal\prodigy> & C:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py  
HSDOH PU  
PS C:\Users\komal\prodigy>

Ln 7, Col 29 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

News for you  
Gold prices trea...



The image shows a Windows 11 desktop environment. The primary focus is the Visual Studio Code (VS Code) application, which is open with a file named 'caesar\_cipher.py'. The code in the editor is a Python script for a Caesar cipher. It starts with a message 'alpha in!' and a shift of 7. It defines 'LAST\_CHAR\_CODE' as 90 and 'CHAR\_RANGE' as 26. The script iterates over each character in the message, checks if it's an alphabetic character, converts it to its ASCII ordinal, shifts it by 7, wraps around if necessary, and then converts it back to a character. The final result is printed. Below the editor is the integrated terminal, which shows the command 'ps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py' being executed. The terminal output shows the command being run from the PowerShell prompt. The Windows taskbar at the bottom displays the time as 12:35 on 03-05-2024, and the system tray shows various icons including network, volume, and battery. The VS Code status bar at the bottom indicates the current file is 'Ln 5, Col 16' and the encoding is 'UTF-8'.

The image shows a Windows 11 desktop environment. The primary focus is the Visual Studio Code (VS Code) application, which is open with a file named 'caesar\_cipher.py'. The editor's interface includes a sidebar on the left with icons for Explorer, Search, Source Control, Run and Debug, and Extensions. The main editor area displays the code for a Caesar cipher script. The code defines a function 'caesar\_shift' that takes a message and a shift value, iterates through the message characters, and shifts their ASCII values. The script uses 'ord' to get the character's ordinal and 'chr' to convert it back. The terminal at the bottom shows the command 'python caesar\_cipher.py' being executed, resulting in the output 'HSMOH PU'. The Windows taskbar at the bottom features the Start button, a search bar, and several pinned application icons including File Explorer, Edge, and VS Code. The system tray on the right shows the date and time as 12:42 on 03-05-2024.

File Edit Selection View Go Run Terminal Help

caesar\_cipher.py X

```
5 def caesar_shift(message, shift):
6     #result
7     result = ""
8
9
10    for char in message.upper():
11        if char.isalpha():
12            # convert in ASCII code
13            # ORD - ordinal & it returns the unicode for char string
14            char_code = ord(char)
15            new_char_code = char_code + shift
16
17            if new_char_code > LAST_CHAR_CODE:
18                new_char_code -= CHAR_RANGE
19
20            new_char = chr(new_char_code)
21            result += new_char
22        else:
23            result += char
24
25    print(result)
26
27 caesar_shift("alpha in!", 7)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\komal\prodigy> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar_cipher.py
H5WOH PU
PS C:\Users\komal\prodigy> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar_cipher.py
H5WOH PU!
PS C:\Users\komal\prodigy> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar_cipher.py
PS C:\Users\komal\prodigy> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar_cipher.py
H5WOH PU!
PS C:\Users\komal\prodigy>
```

Ln 26, Col 1 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

96°F Haze

File Edit Selection View Go Run Terminal Help

caesar\_cipher.py X

```
5 def caesar_shift(message, shift):
6     #result
9
10    for char in message.upper():
11        if char.isalpha():
12            # convert in ASCII code
13            # ORD - ordinal & it returns the unicode for char string
14            char_code = ord(char)
15            new_char_code = char_code + shift
16
17            if new_char_code > LAST_CHAR_CODE:
18                new_char_code -= CHAR_RANGE
19
20            new_char = chr(new_char_code)
21            result += new_char
22        else:
23            result += char
24
25    print(result)
26
27 caesar_shift("alpha in!", 7)
28 caesar_shift("copying", 7)
29 caesar_shift("engaged the co-ordinates", 7)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar_cipher.py
H5WOH PU!
JWfPUN
LURHNLK AOL JV-VKPUHALZ
PS C:\Users\komal\prodigy>
```

Ln 29, Col 38 Spaces: 4 UTF-8 CRLF Python 3.11.9 64-bit (Microsoft Store)

96°F Haze

File Edit Selection View Go Run Terminal Help

caesar\_cipher.py x

caesar\_cipher.py > ...

```
1 FIRST_CHAR_CODE = 65
2 LAST_CHAR_CODE = 90
3 CHAR_RANGE = 26
4
5 def caesar_shift(message, shift):
6
7     #result
8     result = ""
9
10    for char in message.upper():
11        if char.isalpha():
12            # convert in ASCII code
13            # ORD - ordinal & it returns the unicode for char string
14            char_code = ord(char)
15            new_char_code = char_code + shift
16
17            if new_char_code > LAST_CHAR_CODE:
18                new_char_code -= CHAR_RANGE
19
20            if new_char_code < FIRST_CHAR_CODE:
21                new_char_code += CHAR_RANGE
22
23            new_char = chr(new_char_code)
24            result += new_char
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\komal\prodigy> python caesar\_cipher.py
H5WOH PU!
EQRAKPI
QZSMSQP FTQ OA-APUZHFOE
PS C:\Users\komal\prodigy> & c:/Users/komal/AppData/Local/Microsoft/WindowsApps/python3.11.exe c:/Users/komal/prodigy/caesar\_cipher.py
H5WOH PU!
EQRAKPI
QZSMSQP FTQ OA-APUZHFOE
ENGAGED THE CO-ODINATES
PS C:\Users\komal\prodigy> |

96°F Haze

Search

12:56 03-05-2024

File Edit Selection View Go Run Terminal Help

caesar\_cipher.py •

caesar\_cipher.py > ...

```
1 FIRST_CHAR_CODE = ord("A")
2 LAST_CHAR_CODE = ord("Z")
3 CHAR_RANGE = LAST_CHAR_CODE - FIRST_CHAR_CODE + 1
4
5 > def caesar_shift(message, shift):...
29
30 user_message = input("Message to Encrypt: ")
31 user_shift_key = int(input("Shift Key (integer):"))
32
33 caesar_shift(user_message, user_shift_key)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\komal\prodigy> python caesar\_cipher.py
Message to Encrypt: requesting bravo for ack
Shift Key (integer):7
YLBZLZAPUN IYHCV MMY HJR
PS C:\Users\komal\prodigy> |

96°F Haze

Search

13:12 03-05-2024