**Mystery Code Challenge**

**Objectives**

Be able to:

- identify Sequence, Selection & Iteration
- Identify Variables
- Identify Functions
- Understand the operators
  - %
  - +=
  - ==
  - - =
  - >=

**Progression Pathways**

Below you can see which skills you may be able to tick off during this block of work. Remember to open up your spreadsheet and update your personal skills log.

## Computer Progression Pathways Codes

| Algorithms | Programming & Development | Data & Data Representation | Hardware & Processing | Communication & Networks | Information Technology |
|---|---|---|---|---|---|
| A1 | P1 | D1 | H1 | C1 | I1 |
| A2 | P2 | D2 | H2 | C2 | I2 |
| A3 | P3 | | | C3 | I3 |
| | P4 | | | | I4 |
| A4 | P5 | D3 | H3 | C4 | I5 |
| A5 | P6 | D4 | H4 | C5 | I6 |
| A6 | P7 | D5 | H5 | | I7 |
| A7 | | | | | I8 |
| | | | | | I9 |
| A8 | P8 | D6 | H6 | C6 | I10 |
| A9 | P9 | D7 | H7 | C7 | I11 |
| A10 | P10 | D8 | | C8 | I12 |
| A11 | P11 | D9 | H8 | C9 | I13 |
| A12 | P12 | D10 | H9 | C10 | I14: |
| A13 | P13 | | H10 | C11 | I15 |
| | P14 | | | | I16 |
| A14 | P15 | D11 | H11 | C12. | I17 |
| A15 | P16 | D12 | H12 | C13 | I18 |
| A16 | P17 | D13 | H13 | C14 | I19 |
| A17 | P18 | D14 | | | |
| | | D15 | | | |
| | | D16 | | | |
| A18 | P19 | D17 | H14 | C15 | I20 |
| A19 | P20 | D18 | H15 | C16 | I21 |
| A20 | P21 | D19 | | | I22 |
| | P21 | D20 | | | I23 |
| | P22 | | | | |
| | P23 | | | | |
| A21 | P24 | D21 | H16 | C17 | I24 |
| A22 | P25 | D22 | | C18 | I25 |
| A23 | P26 | D23 | | C19 | I26 |
| A24 | P27 | | | | I27 |
| A25 | | | | | I28 |
| A26 | P28 | D24 | H17: | C20 | I29 |
| A27 | P29 | D25 | H18 | | |
| | P30 | D26 | H19 | | |

**Task 1: Type the code below into Python and run the code. Once you have the code working answer the questions at the end of the document.**

```
SYMBOLS = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz'
MAX_KEY_SIZE = len(SYMBOLS)

def getMode():
  while True:
    print('Do you wish to encrypt or decrypt a message?')
    mode = input().lower()
    if mode in ['encrypt', 'e', 'decrypt', 'd']:
      return mode
    else:
      print('Enter either "encrypt" or "e" or "decrypt" or "d".')

def getMessage():
  print('Enter your message:')
  return input()

def getKey():
  key = 0
  while True:
    print('Enter the key number (1-%s)' % (MAX_KEY_SIZE))
    key = int(input())
    if (key >= 1 and key <= MAX_KEY_SIZE):
      return key
```

```
def getTranslatedMessage(mode, message, key):
  if mode[0] == 'd':
    key = -key
  translated = ''

  for symbol in message:
    symbolIndex = SYMBOLS.find(symbol)
    if symbolIndex == -1: # Symbol not found in SYMBOLS.
      # Just add this symbol without any change.
      translated += symbol
    else:
      # Encrypt or decrypt
      symbolIndex += key

      if symbolIndex >= len(SYMBOLS):
        symbolIndex -= len(SYMBOLS)
      elif symbolIndex < 0:
        symbolIndex += len(SYMBOLS)

      translated += SYMBOLS[symbolIndex]
  return translated

mode = getMode()
message = getMessage()
key = getKey()
print('Your translated text is:')
print(getTranslatedMessage(mode, message, key))
```

**Task 2: Questions**

1. **What does the code do?**

**It allows the user to encrypt or decrypt messages.**

2. **This program runs a famous algorithm do you know the name of the algorithm?**

**This cipher's called the Caesar Cipher and it works by shifting letters.**

3. **Describe what you think this algorithm does, even if you don't know the name of it you might be able to work it out. TIP: select encrypt and the key to be 1. What do you notice about the letters it outputs?**

**It asks the user for a message to encrypt or decrypt. Then it asks for the key. The key decides how much each letter will shift. If I chose encrypt, typed in 'I like Summer' and chose the key as 1, I would get 'J mjlf Tvnnfs' If I type in decrpyt and type in 'J mjlf Tvnnfs' and choose 1 as the key, I get the message 'I like Summer'.**

4. **What does the function len do? You have used it before when you were using lists.**

**It finds the length of something.**

5. **In the box below explain with examples of the lines where you can see SEQUENCE, ITERATION and SELECTION.**

```
while True:
  print('Do you wish to encrypt or decrypt a message?')
  mode = input().lower()
  if mode in ['encrypt', 'e', 'decrypt', 'd']:
    return mode
  else:
    print('Enter either "encrypt" or "e" or "decrypt" or "d'
```

**In these lines, everything that is printed is sequence. We also see iteration from 'while' and if and else are selection because the program is choosing or selecting what to do.**

6. **Explain the operators:** % += == - = >=

**% Modulus returns the remainder of a division**

**== Equal to checks if two values are equal to each other.**

**>= More than or equal to checks if one value is greater than or equal to another value.**

**+= Adds another value to a variable's value and makes the variable the result of that. For example:**

```
x=3
x+=2
print x
x = 5
```

**-= Subtracts a value from a variable's value and makes the variable the result of that. For example:**

```
x=3
x-=2
print x
x =1
```

**WHY THIS CODE IN IMPORTANT!**

**The program above is an example of what students had to program in their controlled assessment two years ago. They had to work out the algorithm and program it up in Python without assistance from the teacher. The programming tasks are getting more difficult with the introduction of the new specification. You need to build up and surpass this level of independent coding by this time next year. The only way is practice, practice and practice. Enjoy!**