

Knowledge Organiser - Python

Key Words	
Python	A general purpose programming language which is quite close to English! Programming is the process of writing computer programs.
Algorithm	A set of instructions which is followed to solve a given problem. Can be represented using a flowchart or Pseudocode
Code	The instructions that a program uses.
Sequence	Instructions are executed in order line by line, one after the other.
Selection (IF Statement)	Selects a pathway through a program based on whether a condition is true or false. Allows programs to be branched to have multiple possible outcomes.
Iteration (While / For)	Code or blocks of code are repeated (looped) a set number of times (FOR) or while a condition is True (WHILE)
Variable	A location in memory that stores a value - that can change whilst the program is executed. (e.g. temperature, speed)
Syntax	The grammatical rules that written code has to follow so that the language compiler / interpreter can understand it. Each programming language has its own syntax.
Data Type	The format / category of a piece of data. The most common data types are integer, string, and float/real.
Comparative Operators	When comparing data, an operator is used to solve the equality such as <>, != or ==
Parameter	A variable or value that is passed into a function / subroutine as an input.
Function / Method	A block of code which is isolated for a specific purpose. Methods / functions can be 'called' to execute when required. Functions are sometimes called 'procedures.'
Function Call	The location in the main body of a program which triggers a function / method to execute. The function call may contain parameters to use with the function.
Debugging	Is the process of working through the program in a systematic way to eliminate any flaws or glitches. A debugger program is usually included within the IDE.
Array / List	A data structure which can contain multiple values of different data types (in Python, the default Array structure is called a List)
IDE	An Interactive Development Environment - why we use one to create and develop Python programs

Python (Data Types)	
STRING (str or text)	Used for a combination of any characters that appears on a keyboard, such as letters, numbers and symbols. (school email, your name, postcode) e.g. "Hello World"
CHARACTER (Chr)	Used for single letters ONLY
INTEGER (Int)	Used for whole numbers (Age in years, points scored) e.g. 10, 182, -44
FLOAT or REAL (Float or real)	Used for numbers that contain decimal points, or for fractions. e.g. 2.5, 5.05, 3.14
BOOLEAN (Yes/No True/False)	Used where data is restricted to True/False or yes/no options.

Mathematical operators	
+	Adds values on either side of the operator
-	Subtracts right hand operand from left hand operand
/	Divides left hand operand by right hand operand
*	Multiplies values on either side of the operator
**	Performs exponential (power) calculation on operators
%	Divides left hand operand by right hand operand and returns remainder

Python tells us where the error is and what type it is.

```
Traceback (most recent call last):
  File "C:/Python33/a.py", line 2, in <module>
    prin (greeting)
NameError: name 'prin' is not defined
...
```

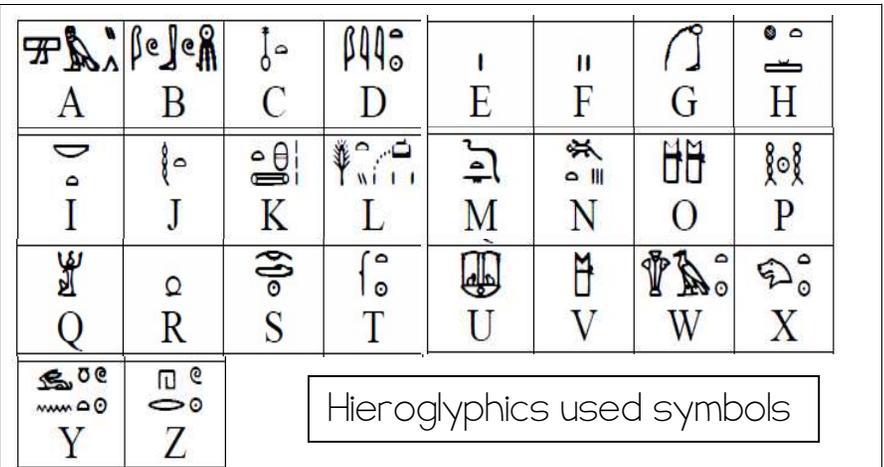
Here it says the line the error is on.

Here it says what type of error.

Selection / Decision		Iteration / Loops	
<p>if statements An if statement consists of a Boolean expression followed by one or more statements.</p>	<pre>age = int(input("what is your age?")) if age < 16: print("you are young!")</pre>	<p>while loop Repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body.</p>	<pre>name = "" while name != "Batman": print("Somebody call Batman!") print("Are you him? ") name = input("what's your name?")</pre>
<p>if...else statements An if statement can be followed by an optional else statement, which executes when the Boolean expression is FALSE.</p>	<pre>age = int(input("what is your age?")) if age < 16: print("you are young!") else: print("your are getting old!")</pre>	<p>for loop Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.</p>	<pre>FOR Loop in range (1,3): PRINT("Hello")</pre>
<p>nested if statements You can use one if or else if statement inside another if or else if statement(s).</p>	<pre>if temp < 8: print("Brr, its a cold day!!!") elif temp >= 8 and temp < 15: print("I'ts a mild day") elif temp >= 15 and temp < 21: print("Its a warm day") elif temp >= 21: print("It's a hot day")</pre>	<p>nested loops You can use one or more loop inside any another while, for or do.. while loop.</p>	<pre>adj = ["red", "big", "tasty"] fruits = ["apple", "banana", "cherry"] for x in adj: for y in fruits: print(x, y)</pre>
<p>The AND keyword is a logical operator, and is used to combine conditional statements</p>	<pre>if a > b and c > a: print("Both conditions are True")</pre>	<pre>##### ### Vigenere Cipher ### This uses a key word instead of just the same number of shifts LETTERS = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ' #defines what letters are to be used in the code def messageIn(): message = input("Enter your message here ") # variable that stores the changed message to capital letters message = message.upper() return message def keyIn(): key = input("Please enter a key word ") key = key.upper() return key</pre>	
<p>The OR keyword is a logical operator, and is used to combine conditional statements:</p>	<pre>if a > b or a > c: print("At least one of the conditions are True")</pre>		
Readability of Code			
<p>Comments</p>	<p>Explain the code - #</p> <p style="text-align: center;"><i>OR</i></p> <p>Comments that span multiple lines adding a delimiter (""") on each end of the comment.</p> <pre>""" This would be a multiline comment in Python that spans several lines and describes your code, your day, or anything you want it to """</pre>		
		<p>Descriptive identifier names</p>	<p>e.g. camelCase</p>
		<p>Indentation and white space</p>	

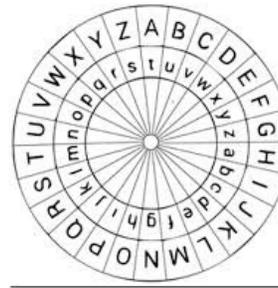
Knowledge Organiser - Cryptography & Cybeseurity

Key words	
Encrypt	Converts plaintext information into what is known as Ciphertext
Decrypt	Converts scrambled information into what is known as Plaintext
Ciphertext	Converted message which has been 'scrambled' so it can't be understood.
Cipher	Ciphertext can't easily be read by unless the Key that was used to encrypt the message is known
Cryptography	Is a method of protecting information and communications through the use of codes, so that only those for whom the information is intended can read and process it.
Caeser Cipher	Is a substitution cipher, meaning that one character in the alphabet is exchanged for another character
Vigenère cipher	Is a method of encrypting alphabetic text by using a series of interwoven Caesar ciphers, based on the letters of a keyword. It employs a form of polyalphabetic substitution.
Pigpen	A cipher used by the Freemasons
Key	This is what is used to encrypt and decrypt information. It can be a word, number or shifts in the alphabet.
Cybersecurity	Is concerned with the protection of computer systems, computer networks and data
Malware	Is software that has been purposely developed to damage, disrupt or take control of computer systems.
Social engineering	Techniques manipulate people into giving away confidential and personal information.
Weak passwords	Are easy to guess. Passwords that use known words are easy to crack using an algorithm that systematically goes through all the words in a dictionary until the word matches the password.
Default passwords	Upon registration for an online account, users may be given a default password that they do not change. Often these passwords are sent out unencrypted via email so pose a major security vulnerability.
Removable media	Such as a USB pen drive can be a vector for transmitting malware.
CAPTCHA	Is a test that can distinguish between humans and bots. It uses images that machines cannot interpret but humans can.
Biometric measures	Such as fingerprints, facial recognition and iris scans are increasingly being used to verify a user's identity for mobile devices.



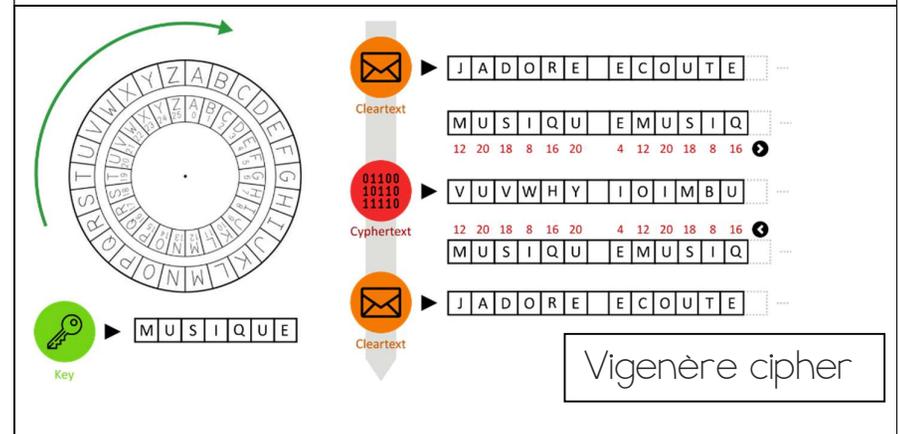
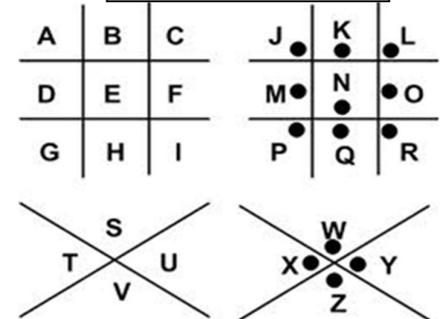
Hieroglyphics used symbols

Caeser Cipher



A Caesar Wheel

Pigpen cipher



Vigenère cipher