**Python Assignment**

**Describe the role of variables and data types in programming and how they are used to store and manipulate data**

**Variables**

Variables are containers for storing data variables. In Python a variable is created by assigning a value to it. However, if you want to specify a data type, it’s done by type casting

Example: sum = double (3.45)

**Conditions for a name to be a variable**

It should:

* Start with a letter or underscore and never a number
* Contain only alpha-numeric characters and underscores
* Not be python keywords

The variables are case-sensitive

**Data Types**

Examples of data types:

* str
* int
* float
* list
* tuple
* dict
* set
* bool
* bytes

The type function, type (), returns data type.

Numbers

For numbers, int and float types are used.

int is for whole numbers and float for numbers with a floating point.

complex data type is used for complex or imaginary numbers.

You can convert one type to another using the int (), float(), and complex() methods

Strings

Usually surrounded by single or double quotation marks.

Can be treated as an array.

Use for loop to loop through the string.

String concatenation combines two string using + operator.

“in” keyword checks if a character or phrase is present in a string and “not in” to check if it’s absent

Slicing syntax is used to return a part of the string by including the start and end index.

Methods:

* len () function returns string length.
* strip () removes whitespace
* upper () method returns string in upper case and lower( ) returns in lowercase
* replace () replaces a string with another one

**List**

Lists store multiple items in a single variable.

Created using square brackets.

They are usually ordered (but we have list methods to change that order) and can have duplicates.

List constructors can be used to create lists and usually have double brackets eg

fruits = list ((“apple”, “mango”))

Note that lists can have more than one data type in a single variable.

**Tuple**

Tuples are ordered and unchangeable but have round brackets unlike lists. They also allow duplicate items.

A comma has to be added at the end of a single item tuple.

**Set**

Items are unordered and unchangeable and are surrounded by curly brackets.

Sets are unindexed.

True and 1 as well as false and 0 are treated as duplicates

**Dictionaries**

Store data values in key: value pairs.

Dicts are ordered and changeable but don’t allow duplicates.

Written with curly brackets.

You can access the items of a dictionary by referring to its key name, inside square brackets or using get method.

Keys () method returns list of all keys while values () returns the dictionary values.

items () return each item in a dictionary as a tuple in a list.

update () updates a dictionary while pop () removes an item

del keyword can also be used to remove an item but can also delete the entire dictionary

clear method empties the dictionary

**Boolean**

They have two values: True or False