Computer Science Year 9 Python Programming

Key Knowledge

- Sometimes we need computers to remember the information we give it and that it calculates during programs. A variable can be thought of as a box that the computer can use to store a value. The value held in that box can change or 'vary'.
- A program can use as many variables as it needs it to. Variables are a key element of programming. They are used for calculations, for storing values for later use, in decisions and in iteration. It is important to use meaningful names for variables.
- Programs require data to be input. This data is used (processed) by the program, and data (or information) is output as a result. Once data has been processed, programs often need to output the data they have generated. In Python, the 'print' statement is used to output data. o

Control Flow

```
if conditional:
    <body>
elif conditional:
    <body>
else:
    <body>
```

```
for value in list:
    <body>
    continue
    break
```

```
while conditional:
    <body>
    continue
    break
```

e.g.

```
if i == 7:
    print "seven"
elif i == 8:
    print "eight"
else:
    print str(i)
```

e.g.

```
for i in [1, 2, 3, 4]:
    if i == 2: continue
    if i == 3: break
    print i
```

e.g.

```
while True:
    print "infinity"
```

Comparisons

value1 == *value2*	"str" == "str" → **True**
value1 != *value2*	"str" != "str" → **False**
value1 < *value2*	1 < 2 → **True**
value1 <= *value2*	2 <= 2 → **True**
value1 > *value2*	2 > 3 → **False**
value1 >= *value2*	3 >= 3 → **True**
value **is [not] None**	
value **in** *list*	1 in [2,3,4] → **False**
isinstance(*class instance*, *ClassName*)	

Comments

```
"""
   Multi-line comment
"""
```

```
# Line Comment
```

Variable Assignment

```
integer = 1
string = "string"
unicode_string = u"unicode string"
mutli_line_string = """ multi-line
        string
        """
tuple = (element1, element2, element3, ...)
list = [ element1, element2, element3, ... ]
dictionary = { key1 : value1, key2 : value2, ... }
dictionary[key] = value
class_instance = ClassName(init_args)
```

Basic Arithmetic

```
i = a + b        i = a - b
i = a / b        i = a * b
i = a % b    e.g. 11 % 3 → 2
```

Frequently used built-in types

True	**False**	**None**
str	**unicode**	**int**
float	**list**	**dict**

Other than **True**, **False** and **None**, these can also be used as functions to explicitly cast a value to that type

Key Vocabulary

List	A list is a collection of data that is assigned to just one variable. A list can contain any data types. Each item in the list is given an index to identify it; these start at index 0. For example list = [23, 65, 34, 87] or list = ['apple', 'pear', 'orange']
For loop	A Python 'for loop' is a special loop that will count from a starting number to an end number. For example, we can count from 1 to 10, backwards from 10 to 1 or including a negative to positive number line - such as from -10 to 10. or count in range(6)will count from through 0, 1, 2, 3, 4, 5 for count in range(1, 11)will count from through 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. for count in range(-3, 4) will count through -3, -2, -1, 0, 1, 2, 3
Function	A Python function is a separate segment or block of code than can be used any number of times by your main program. We can also use this block of code to return some type of calculation or other new value back to our main program as well.
Return	'Return' is a Python reserved word that is used to return a value from a function back to the main program that uses it. Functions don't need to return values however. It depends on the purpose of your function.
Parameter	A Parameter refers to the data given to a function when we use it. We don't have to provide data to a function, but we often do this so that a function can perform some specific task of calculation with the data we have given it.
Algorithm	A sequence of logical instructions for carrying out a task. In computing, algorithms are needed to design computer programs.
Programming language	A language used by a programmer to write a piece of software. There are many programming languages.
Variable	In a computer program, this is a memory location where values are stored.