Problem Set

1. **Multiple Choice:** Which of the following is NOT a basic object type in Python?
   - a) Boolean
   - b) Dictionary
   - c) Complex
   - d) String
2. **Long Answer:** Explain the difference between a tuple and a list in Python. Give an example of when you might use each type.
3. **Long Answer:** What is the purpose of modules in Python? Give an example of how you would import and use the `math` module.
4. **Long Answer:** Describe the purpose of the `if` statement in Python. Provide an example of how you would use it in a code block.

Solutions

1. **Multiple Choice:** b) Dictionary is not a basic object type in Python. The basic object types in Python are None, Boolean, Integer, Long, Float, Complex, String, and Tuple.
2. **Long Answer:** In Python, a tuple is an immutable sequence type, meaning that its elements cannot be changed once it is defined. A tuple is defined with parentheses and elements are separated by commas. For example, `my_tuple = (1, 2, 3)` creates a tuple with the values 1, 2, and 3.

A list, on the other hand, is a mutable sequence type, meaning its elements can be changed. A list is defined with square brackets and elements are separated by commas. For example, `my_list = [1, 2, 3]` creates a list with the values 1, 2, and 3.

You might use a tuple when you have a collection of values that should not be changed, such as the x and y coordinates of a point. You might use a list when you need a collection of values that can be modified, such as a list of numbers that you want to sort or filter.

3. **Long Answer:** Modules in Python are files that contain Python code, which can be imported and used in other Python scripts. Modules provide a way to organize and reuse code.

To import the `math` module and use it in your code, you can use the `import` keyword followed by the module name. For example:

```
import math
print(math.cos(math.pi/3))
```

This imports the `math` module and uses the `cos` function to calculate the cosine of pi/3.

Alternatively, you can import specific functions or variables from a module using the `from` keyword. For example:

```
from math import cos, pi
print(cos(pi/3))
```

This imports only the `cos` function and the `pi` variable from the `math` module.

4. **Long Answer:** The `if` statement in Python is used to make decisions based on the value of a condition. It allows you to execute a block of code if a certain condition is true.

Here is an example of how you would use the `if` statement in a code block:

```
x = 10
if x > 5:
    print("x is greater than 5")
else:
    print("x is less than or equal to 5")
```

In this example, if the value of `x` is greater than 5, the program will print "x is greater than 5". Otherwise, it will print "x is less than or equal to 5".