Department of Social Statistics

Faculty of Humanities and Social Sciences

University of Sri Jayewardenepura

MIT/ITE 1213 – Fundamentals of Programming

Tutorial – 06

Python Arrays

What is an Array?

An array is a special variable that can hold more than one value at a time.

Example: **Without Arrays**

```
car1 = "Ford"
car2 = "Volvo"
car3 = "BMW"
```

This is fine for 3 cars, but what if you had 300 cars? That's why arrays are useful.

Example: **With Array**

cars = ["Ford", "Volvo", "BMW"]

Now all car names are stored in one single variable.

Accessing Elements

You can access elements in an array by their index number.

```
cars = ["Ford", "Volvo", "BMW"]

print(cars[0])  # Ford

print(cars[1])  # Volvo

print(cars[2])  # BMW
```

Modify Elements

```
cars[0] = "Toyota"

print(cars)  # ['Toyota', 'Volvo', 'BMW']
```

Length of an Array

Use the len() function to get the number of items in an array.

```
cars = ["Ford", "Volvo", "BMW"]
print(len(cars))  # 3
```

Looping Through an Array

You can loop through all elements with a for loop.

```
cars = ["Ford", "Volvo", "BMW"]

for x in cars:
   print(x)

Output:

Ford
Volvo
BMW
```

Adding Elements

Use **append()** to add at the end.

```
cars = ["Ford", "Volvo", "BMW"]
cars.append("Honda")
print(cars)  # ['Ford', 'Volvo', 'BMW', 'Honda']
```

Use **insert()** to add at a specific position.

```
cars.insert(1, "Audi")
print(cars)  # ['Ford', 'Audi', 'Volvo', 'BMW', 'Honda']
```

Removing Elements

Use **pop()** to remove by index.

```
cars = ["Ford", "Volvo", "BMW"]
cars.pop(1)
print(cars)  # ['Ford', 'BMW']
```

Use **remove()** to remove by value.

```
cars = ["Ford", "Volvo", "BMW"]
cars.remove("Volvo")
print(cars)  # ['Ford', 'BMW']
```

Useful Array (List) Methods

Here are some important methods you can use on lists (arrays):

Method	Description
append()	Adds an element at the end
clear()	Removes all elements
copy()	Returns a copy of the list
count()	Returns how many times a value appears
extend()	Adds another list (or iterable) to the current list
index()	Returns the index of a value
insert()	Adds an element at a specific position
pop()	Removes element at a position
remove()	Removes the first occurrence of a value
reverse()	Reverses the list order
sort()	Sorts the list

Further explanation:

```
cars = ["BMW", "Ford", "Volvo", "BMW"]

cars.sort()
print(cars)   # ['BMW', 'BMW', 'Ford', 'Volvo']

cars.reverse()
print(cars)   # ['Volvo', 'Ford', 'BMW', 'BMW']

print(cars.count("BMW"))  # 2

cars.clear()
print(cars)   # []
```

Exercises

1. Create an array of fruits: "Apple", "Banana", "Cherry". Print the array.
2. Print the first and last fruit from the array.
3. Change "Banana" to "Mango".
4. Find out how many fruits are in the array.
5. Print each fruit one by one using a loop.
6. Add "Orange" to the array.
7. Insert "Grapes" at index 1.

More advanced So, you need to think more:

8. Create an array of numbers [10, 45, 2, 99, 7] and print the largest number.
9. Find the sum of [5, 10, 15, 20].
10. Ask the user to enter a car name, and check if it exists in the array.
11. Write a function print_numbers(nums) that prints each number in a list.
12. Write a function add_all(nums) that adds all numbers in a list and prints the total.
13. Write a function first_last(items) that prints the first and last elements of a list.
14. Write a function greet(names) that prints "Hello <name>" for each name in the list.
15. Create a list of your 3 favorite foods and print them one by one.