Python Lists

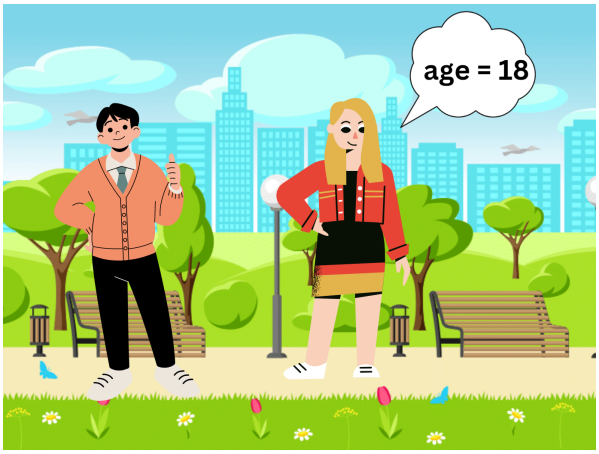
How do we store information?

The difference between variables and Lists.

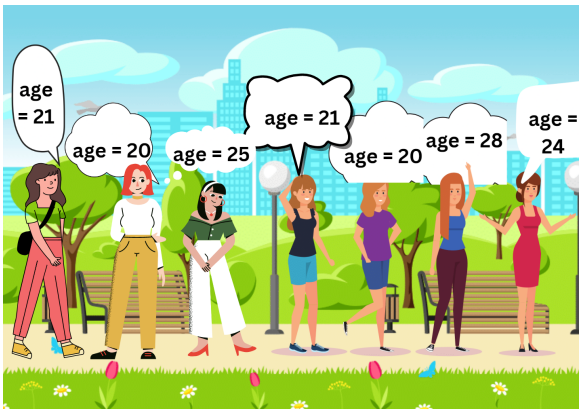
- We use variables to store the data.
- For Example: If I said you want to store the name of Rahul's Current girlfriend's age.

  So you will simply make a girlfriend_age variable

```
girlfriend_age=18
```



But if I said to you to store all his girlfriends age till today



girlfriend1_age=21
girlfriend2_age=20
girlfriend3_age=25
girlfriend4_age=21
girlfriend5_age=20
girlfriend6_age=28
girlfriend7_age=24

To store 7 girlfriends' ages, we need to declare 7 variables.

```
girlfriend3_age=25
girlfriend2_age=20
girlfriend4_age=21
girlfriend5_age=20
girlfriend6_age=28
girlfriend1_age=21
girlfriend7_age=24
```

Isn't possible that one variable will contain all names?

Yes, It is possible with the Lists.

Lists

Discuss how to declare List

- Lists are used to store multiple items in a single variable.
- List literals are written within square brackets [ ].

Declaration of an Lists

```
mylist = []
```

If I want to store all 5 names in a single variable, then it is possible through a list

```
mylist= [”Prateek”, “Nrupul”,”Yogesh”,”Aman”,”Albert”];
```

- List items are ordered, changeable, and allow duplicate values.

- List items are indexed, the first item has index `[0]`, the second item has index `[1]` etc.

Code 1: Declare and print 3 students names using variables

```
name1 = “Rahul”;
name2 = “Shubham”;
name3 = “Rishabh”;
print(name1);
print(name2);
print(name3);
```

Code 2: Declare and Print 3 students names using an List

```
names = [“Rahul”, Shubham”, “Rishabh”];
print(names[0]);
print(names[1]);
print(names[2]);
```

Solve the following problem

Code 3: Perform the following tasks :

1. **Create a List of vegetables**
2. **Store 3 vegetables**
3. **Print all the vegetables**

```
vegetables = [“Tomato”, “Beans”, “Onion”];
print(vegetables[0]);
print(vegetables[1]);
print(vegetables[2]);
```

Note: Don’t write vegetables[3] that will give `IndexError: list index out of range`

Solve the following problem

This is NH-44 Highway which is passing through different states;

Could you pls put this in a list and print it one by one;


```
highways= [“Jammu and Kashmir”, “Karnataka”, “Tamil Nadu”];
print(highways[0]);
print(highways[1]);
print(highways[2]);
```

List Items - Data Types

List items can be of any data type:

```
list1 = ["apple", "banana", "cherry"]
list2 = [1, 5, 7, 9, 3]
list3 = [True, False, False]
```

How to find the length of the list?

- It means How many elements present in the list.
- Use the `len()` function to calculate the length.

Code 4: Find the length of the vegetable list.

```
vegetables = [ ”Tomato”, “Beans”, “Onion”];
print(len(vegetables));
```

Solve the following problem

Code 5: Perform the following tasks :

1. **Create a list of prices.**
2. **Store the prices of 3 products in the list**
3. **Print the price of the last product.**

Not a generic code :

```
prices = [45, 71, 29];
print(prices[2]);
```

Generic Code :

```
prices = [45, 71, 29];
last_index = len(prices) -1;
print(prices[last_index])
```

type()

The type of a Python object determines what kind of object it is; every object has a type. An object’s type is accessible as its `__class__` attribute or can be retrieved with `type(obj)`

What is the data type of a list?

```
mylist = ["apple", "banana", "cherry"]
print(type(mylist))
```

How to add elements in a List?

Append Items

To add an item to the end of the list, use the `append()` method:

- `append()` always inserts at the last.

Code 6: Insert 5 movie names in the List.

```
 items2 = [];
items2.append(”Bahuballi”);
items2.append(”Avengers”);
items2.append(”Spider Man”);
```

Code 7: Perform the following tasks :

1. **Create list of superheroes**
2. **push 4 superheroes in the List**
3. **Print the List**

```
superheroes=[];
superheroes.append(”batman”);
superheroes.append(”superman”);
superheroes.append(”ironman”);
print(surperheroes)
```

How to update the List?

- Suppose I want to change the first index value.
- `superheroes[0] = "Thor";`

How to print all elements using Loop?

Loop Through a List

- print all the elements using a loop.

Code 8: print all the elements of the list using a loop.

```
movies = [];
movies.append("batman");
movies.append("superman");
movies.append("ironman");

for i in range(len(movies)):
  print(movies[i])
```

Code 9: Perform the following tasks :

1. **Create a List of movies and actors**
2. **Print all the movies names with actors**

```
 movies = ["bahuballi", "Spider-Man", "Iron Man", "Super Man"];
 actors = ["Prabhas", "Tom holland", "Robert Downey", "Henry Cavil"];

for i in range(len(movies)):
  print(movies[i])

Note:The length of both Lists should the be same
```

How to remove elements from a list?

- To remove elements, we have a pop() function
- pop() function that will remove elements from the last.

Code 10: pop the last 2 elements from an list

```
movies = [];
movies.append("batman");
movies.append("superman");
movies.append("ironman");

movies.pop();
movies.pop();
print(movies);
```

Code 11: Perform the following tasks :

1. **Create list of 6 numbers**
2. **print the numbers list**
3. **delete the last 3 numbers from that list**
4. **print the numbers list**

```
#First Way

numbers = [2,3,4,5,6,7];
print(numbers);
numbers.pop();
numbers.pop();
numbers.pop();
print(numbers);
```

```
#Second Way
numbers = [2,3,4,5,6,7];
print(numbers);

for i in range(3):
  numbers.pop()
print(numbers);
```

List with Loop and Break

Code 12: Print the first 3 items in the List using a loop.

```
#First Way

movies = ["bahuballi", "Spider-Man", "Iron Man", "Super Man"];

for i in range(3):
  print movies[i]
```

```
#Second Way [ Using Break ]

movies = ["bahubali", "Spider-Man", "Iron Man", "Super-man"]
```

```
for i in range(len(movies)):
  if i==3:
    break
  print(movies[i]);
```

Lists with Loop and Continue

Code 12: Print all movies except the third movie.

```
movies = ["bahubali", "Spider-Man", "Iron Man", "Superman"]

for i in range(len(movies)):
  if i==2:
    continue
  print(movies[i]);
```

Code 13: Print all movies except the third and fifth movies.

```
movies = ["bahubali", "Spider-Man", "Iron Man","Superman","Thor", "Avengers"]

for i in range(len(movies)):
  if i==2 or i==4:
    continue
  print(movies[i]);
```

Code 14: Find the sum of all subject marks and average also.

```
subject_marks = [10, 15, 19, 20, 21];
sum_marks = 0;

for i in range(len(subject_marks)):
  sum_marks = sum_marks + subject_marks[i];


average = math.floor(sum_marks/len(subject_marks))
print("Total sum is ",sum_marks);
print("Average is ",average);
```