3. Data Types

1. Numbers
   - int
   - float
   - complex
2. Boolean Type
   - Yes, No or True False
3. String
   - single line string
   - multi-line string
4. List
   - Homogenous as Array
   - Hetrogenous as Link List
   - Nested List as Matrix
5. Tuple
   - Immutable List
6. Dictionary
   - Map Type object, stores key-value pairs
7. Set
   - Unique Collection of Items
8. Frozen Set
   - Immutable Set
9. None Type
   - null values
10. bytearray
11. range

What is Data Type ?

```
A Data Type tell us about the property of data, or more specifically it tell us how
much memory we need to store it in program and how we can process it or apply
operations on data
```

Fundamental Data Types vs Immutability:

```
All Fundamental Data types are immutable. i.e once we creates an object,we cannot
perform any changes in that object.
If we are trying to change then with those changes a new object will be created.
This non-chageable behaviour is called immutability.

In Python if a new object is required, then PVM wont create object immediately.
First it will check is any object available with the required content or not.
If available then existing object will be reused. If it is not available then only
a new object will be created.
The advantage of this approach is memory utilization and performance will be
improved.
```

But the problem in this approach is,several references pointing to the same object,by using one reference if we are allowed to change the content in the existing object then the remaining references will be effected. To prevent this immutability concept is required.

According to this once creates an object we are not allowed to change content. If we are trying to change with those changes a new object will be created.

Category of Data Type

Mutable

> we can perform update, add, or remove
> operations on data
> data that can be changed

Immutable

> we can not perform update, add, or remove
> operation on data
> data can not be changed

In [1]:
```python
from IPython.display import Image
Image(filename='immutability.png')
```

Out[1]:

>>> a=10	>>> a=10+5j	>>> a=True	>>> a='durga'
>>> b=10	>>> b=10+5j	>>> b=True	>>> b='durga'
>>> id(a)	>>> a is b	>>> a is b	>>> a is b
1572353952	False	True	True
>>> id(b)	>>> id(a)	>>> id(a)	>>> id(a)
1572353952	15980256	1572172624	16378848
>>> a is b	>>> id(b)	>>> id(b)	>>> id(b)
True	15979944	1572172624	16378848