Session1:

- Introduction to Computer
- Introduction to Programming Language
- Orange Juice Analogy
- Compilation Flows -> C++ and Java
- Interpretation Flow -> Python
- A very Simple Program in Python (Execute on Terminal)
- Installation - Python, Visual Studio Code
- JupyterLabs, Google CoLab (Online env)
- On the OS (Application SW) vs In the OS (System SW) -> Interview Que
- Everything in the world in MATEHMATICAL

Session2:

- What is main ?

  MyApp.cpp

```
#include<iostream>
int main(){
        cout<<”Hello”;
        return 0;
}
```

  MyApp.java

```
class MyApp{
        public static void main(){
                System.out.println(”Hello”);
        }
}
```

  General Definition -> main is that part of program, from where it begins

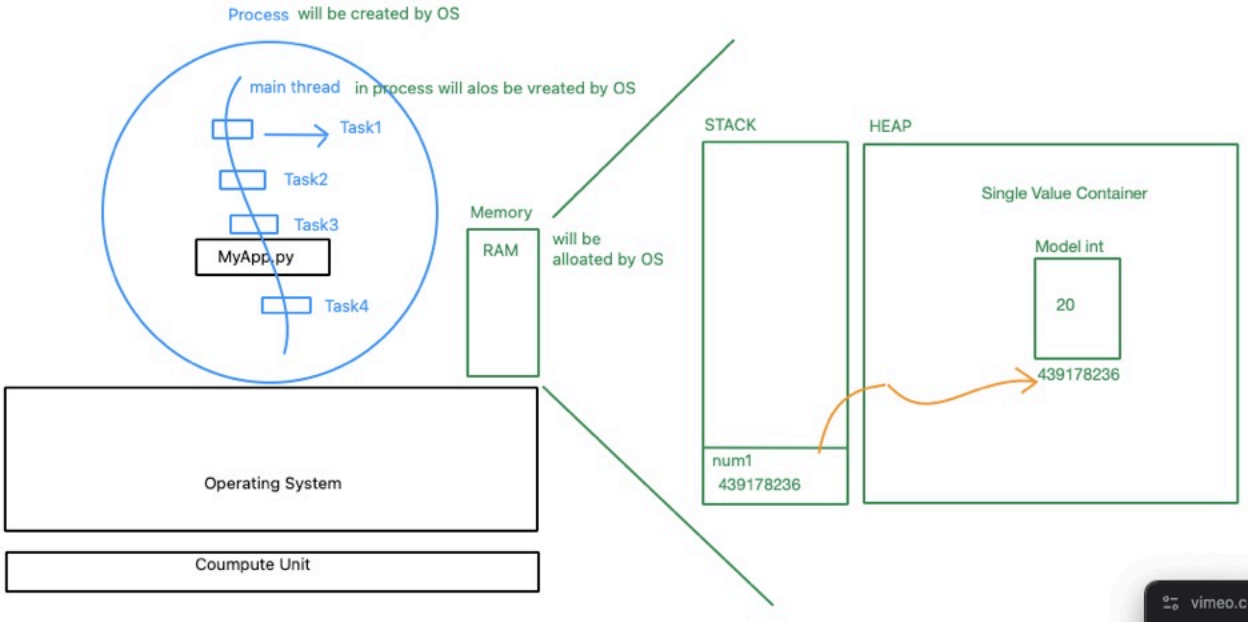
  MyApp.py

```
print(‘hello’)
```

  In Python, by default you can code without any main

- What is a Process ?
  A running app is known as a process
  A program in execution is a process

A process has a thread, it has memory associated it
The very first thread in a process is known as main thread



A simple program in python:

num1 = 10 -> Instruction1/Task1/Job1
num2 = 20 -> Instruction2/Task2/Job2
result = num1 + num2 -> Instruction3/Task3/Job3
print(result) -> Instruction4/Task4/Job4

In a program, we can have below kind of instructions:

1. Write Statement
2. Read Statement
3. Update Statement
4. Delete Statement
5. Computation Statement, which can result in any of above 4

Analogy: Pendrive

- MODEL VIEW CONTROLLER Architecture
  MVC Architecture

Model -> Deals with Data (Data can be containerised) -> Space Complexity

Data Structure

A container holds data, just the way we put sugar in a container in the kitchen

View - represents Interfaces

Controller - represents logic

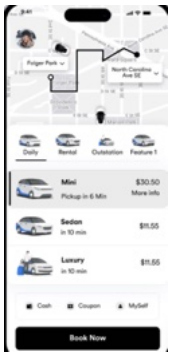
Uber Case Study to understand MVC Architecture

Model

- source location
- destination location
- type of cab

Purpose: To Store Data

View -> Interface



Purpose-> to show data form MODEL and to capture data from user into MODEL

Controller -> Logic (Maths/Reasoning/Logical SkillSet) -> Time Complexity

Algorithm

> Search the shortest distance with least traffic

> Closest Driver, also second closest if first cancels

> Least Fare

> Book Sedan at price of Mini

Purpose -> Get Data from MODEL -> Do Computation -> Show on UI

OR Capture from UI -> Do Computation -> Put in Model

- Create, Update, Delete and read in a program

- TIME is Top Notch Thing

  Any innovation in world aims to solve a problem, which is 100 percent linked with TIME

Code for the Day:

```
# Create Statement
# MODEL: Container -> Single Value
num1 = 10
# num1: is a reference variable created in STACK of RAM
# 10 gets strored in a Container of type int in HEAP of RAM

# Read Statement
print('num1 is:', num1)
print('type of num1 is:', type(num1))
print('num1 hashcode is:', id(num1))

# Update Statement
num1 = 20

# Read Statement -> VIEW
print('num1 now is:', num1)
print('type of num1 now is:', type(num1))
print('num1 hashcode now is:', id(num1))

# Delete Statement
# Explicit (del statement) or Implicit (Automatic)
del num1

print('num1 now is:', num1)
print('type of num1 now is:', type(num1))
print('num1 hashcode now is:', id(num1))
```

Session3:

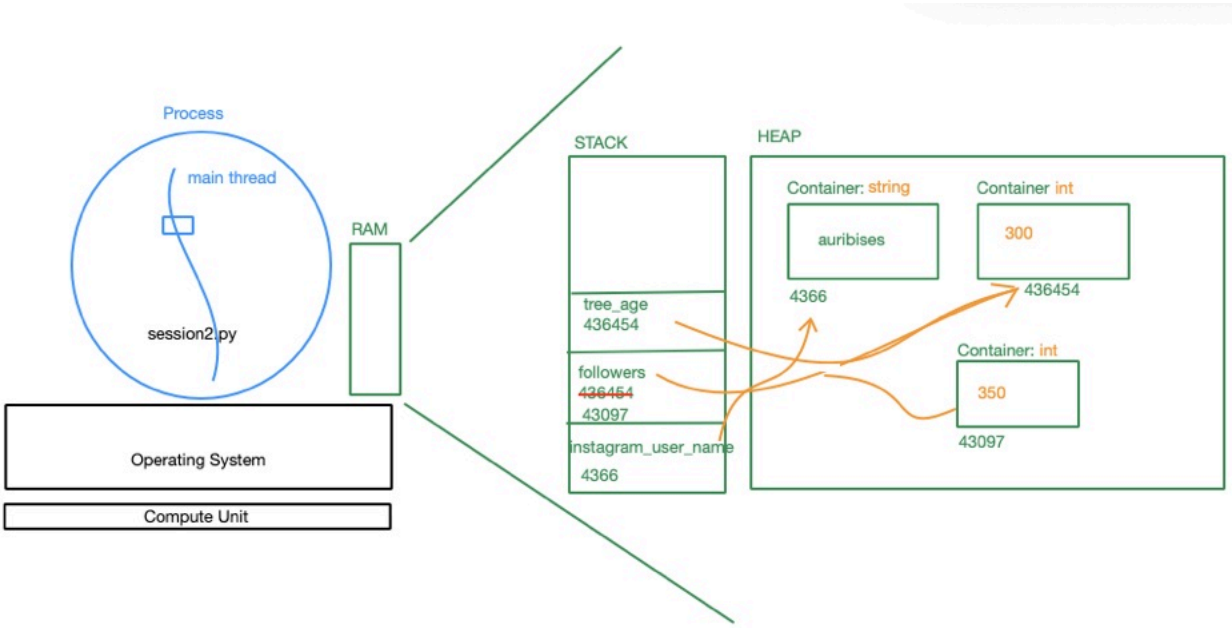
MODEL VIEW CONTROLLER

Model -> Deals with Data
View -> Represents Interface
Controller -> Logical Reasoning

Data Structure -> Space Complexity
User Interface -> User Experience (UX)
Algorithm -> Time Complexity

MODEL -> Storage Container -> Data Structure

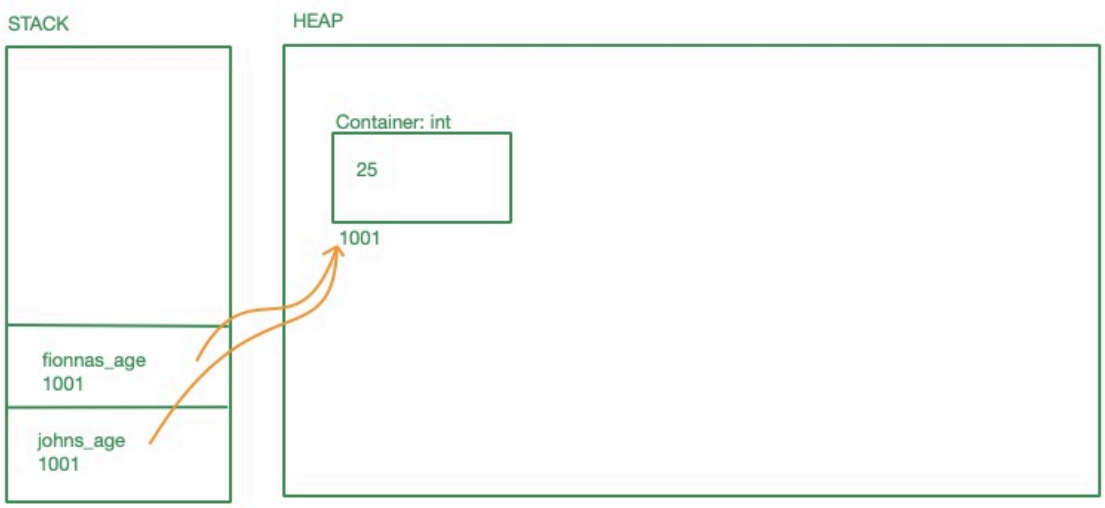
- Single Value Container
- Multi Value Container
    - Homogeneous MVC
    - Hetrogeneous MVC



Functions
f(x) = 2x + 1
f(x,y) = 2x + y + 1

x -> 1, result -> 3

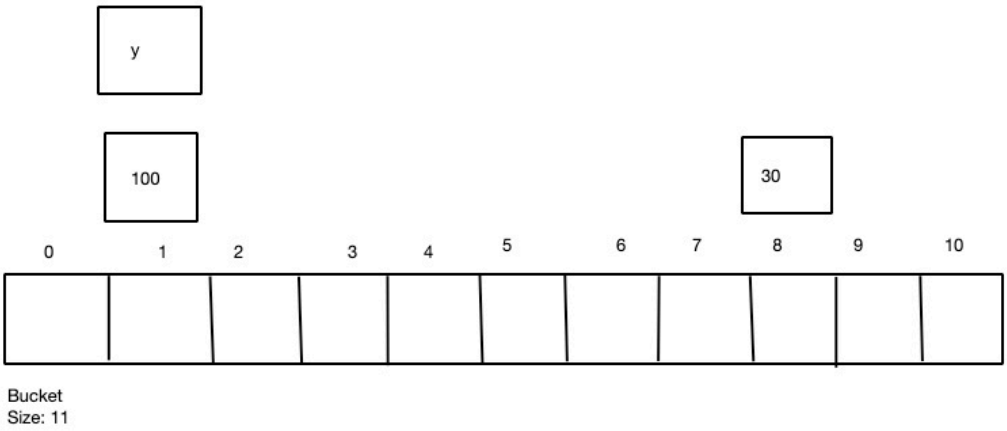
x->1 and y->2, result -> 5



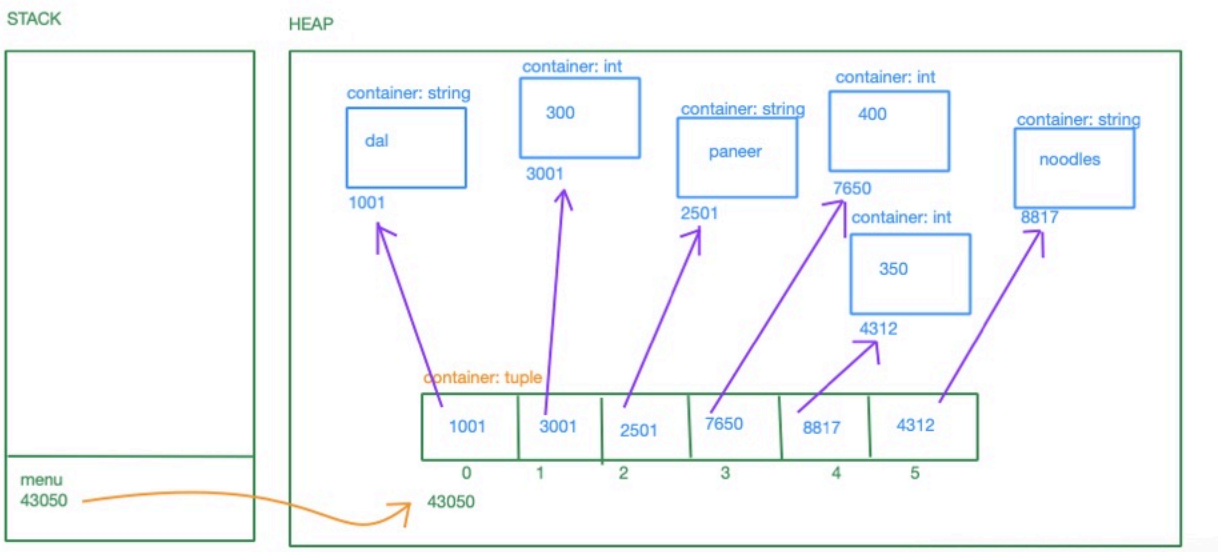
Hashing -> Logical Way how to store data (Algorithm)
HashCode is an outcome of Hashing

Hashing Function
Bucket Size: 11

h(X) = X % size
X = 100
h(100) = 1 (hashcode)
h(30) = 8 (hashcode)
h(200) = 2

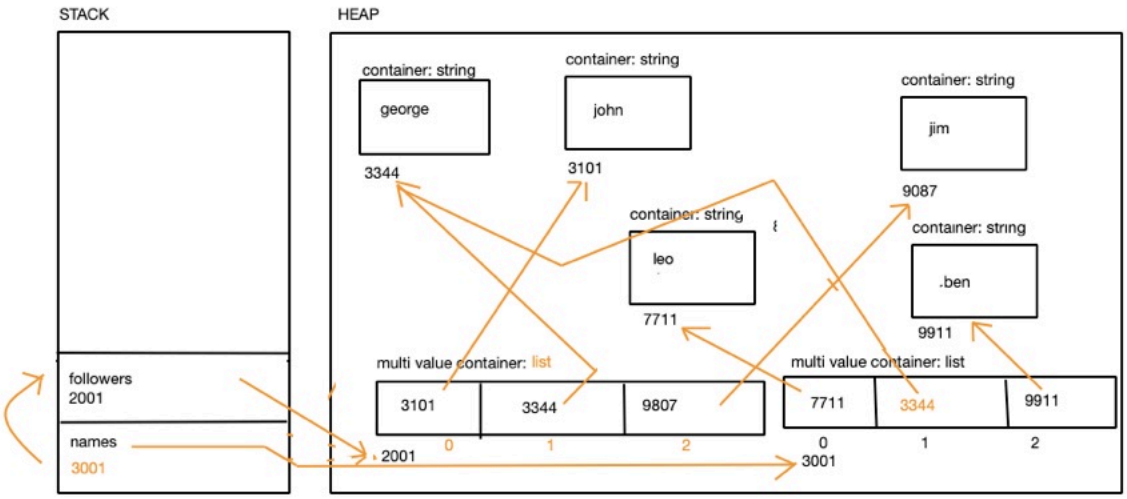


Multi Value Container: Tuple



Session4:

- Multi Value Container
  - Tuple
  - List
  - Dictionary



Session5:

Set

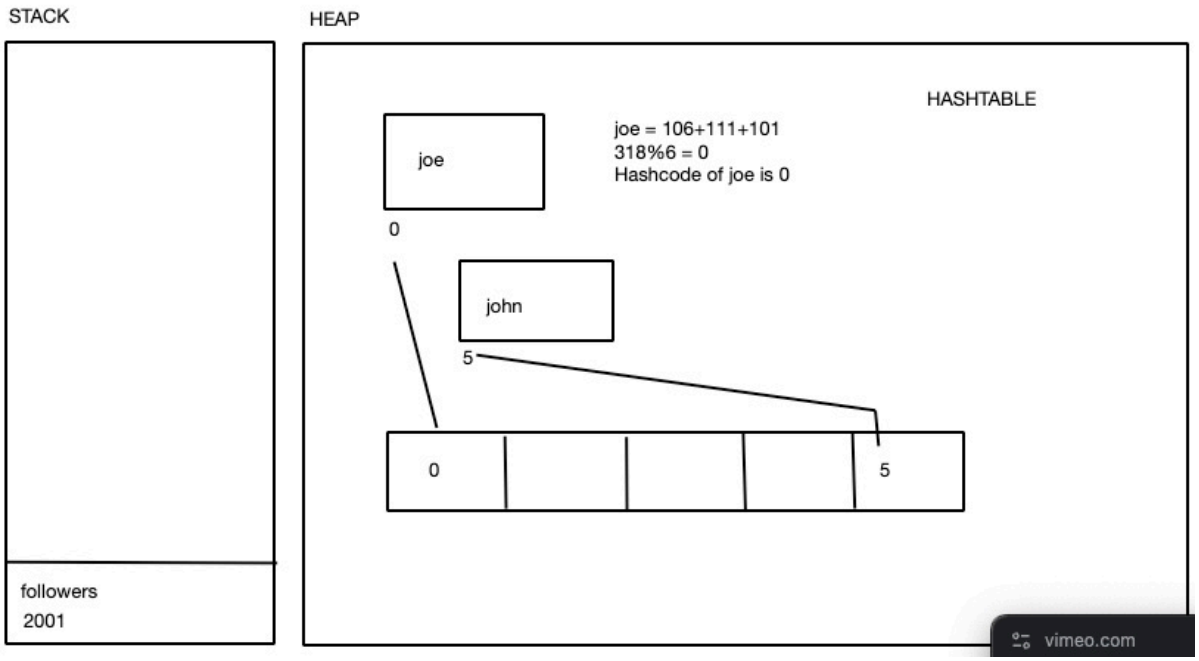
Bucket Size = 6

joe = 106+111+101 = 318 % 6 = 0
john = 106 + 111 + 104 + 110 = 431 %6 = 5

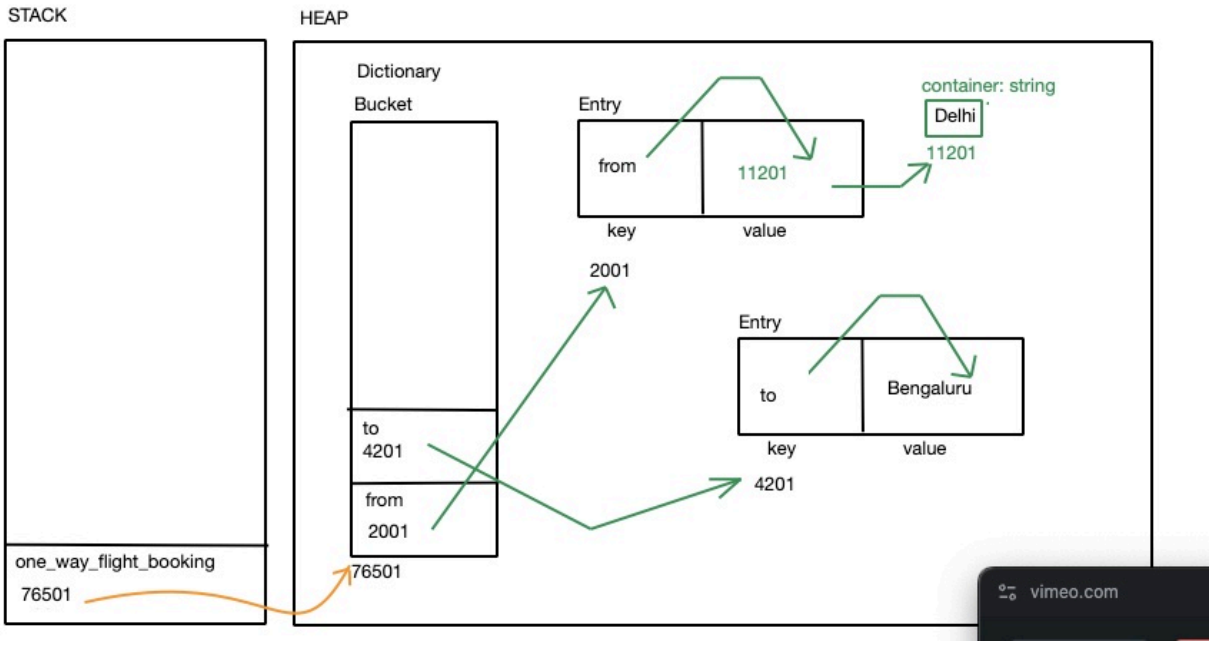
Dictionary

RAM Model for Set and Dictionary

SET



DICTIONARY



View

- input function
- how we can use the right type for input

Controller - Logic

- Computation - Operators (Maths)

- Conditional Constructs -> if/else
- Loops/Iterators

Session6

- Shift Operators
  >>
  <<
  bit wise shifting specially on odd/negative numbers to get accurate result

- if/else
  - simple
  - nested
  - ladder

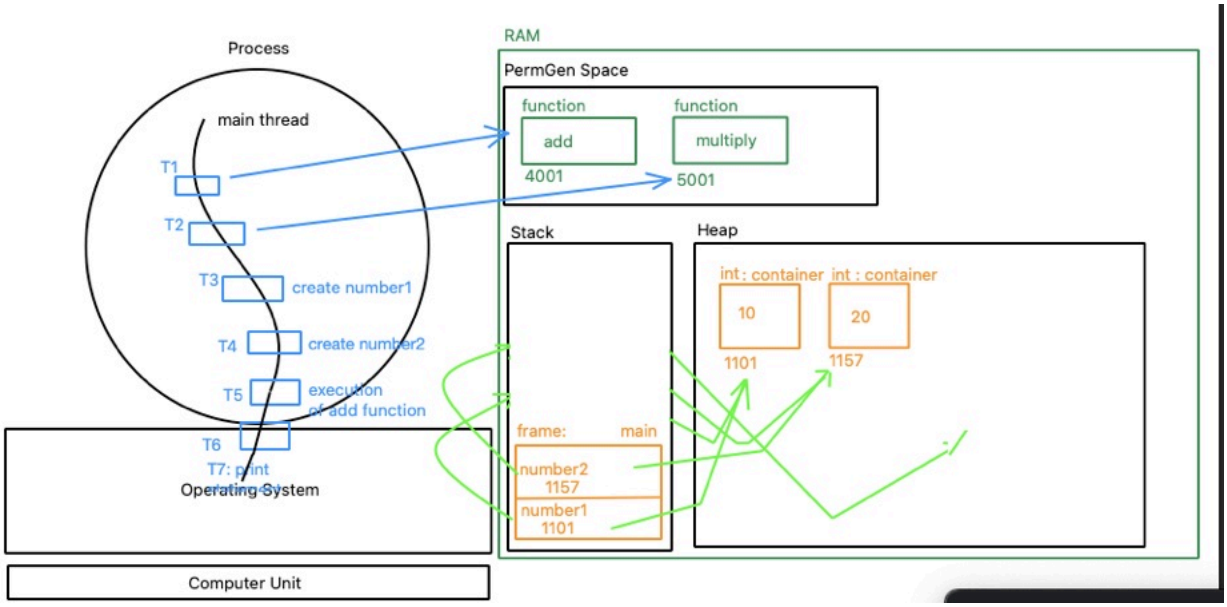
- loops
  - while
  - for

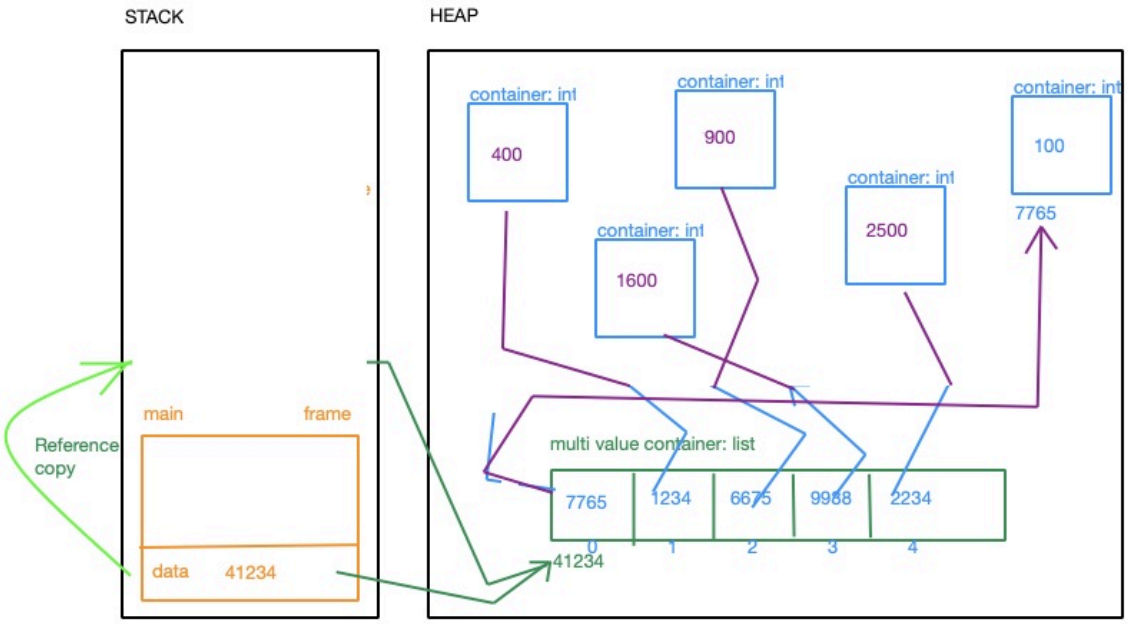
Session6

- Another Brick in the wall
- Nested Loops
- Max and Min in a List
- Functions, why, when and how ?

Session7

- main function in python
- Explore Functions
- Functions in Memory





- Functions having different inputs
- Recursion