# Assignment 2

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# Chapter 1

# Hierarchical Index

## 1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:


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SALst.SALst . . . . . 12
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NamedTuple
    StdntAllocTypes.SInfoT . . . . . 17

# Chapter 2

# Class Index

## 2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:


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: An abstract data type that stores the allocated departments and students . . . . . 7

DCapALst.DCapALst
: An abstract data type that stores departments and it's capacity . . . . . 8

StdntAllocTypes.DeptT
: An abstract data type that represents department name . . . . . 11

StdntAllocTypes.GenT
: An abstract data type that represents gender . . . . . 11

SALst.SALst
: An abstract data type that stores student information . . . . . 12

SeqADT.SeqADT
: An abstract data type that represents a sequence (in the set) . . . . . 15

StdntAllocTypes.SInfoT
: An abstract data type that represents all student info except macid . . . . . 17

# Chapter 3

# File Index

## 3.1 File List

Here is a list of all documented files with brief descriptions:


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src/SeqADT.py
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# Chapter 4

# Class Documentation

## 4.1 AALst.AALst Class Reference

An abstract data type that stores the allocated departments and students.

### Static Public Member Functions

- def init ()

  *init initial data structure*
- def add_stdnt (dep, m)

  *add_stdnt adds elements in the form of tuple to the set data structure*
- def lst_alloc (d)

  *lst_alloc provides with the list of macids in the department*
- def num_alloc (d)

  *num_alloc provides with the number of allocated macids in the department*

### Static Public Attributes

- **s** = list()

### 4.1.1 Detailed Description

An abstract data type that stores the allocated departments and students.

### 4.1.2 Member Function Documentation

#### 4.1.2.1 add_stdnt()

```
def AALst.AALst.add_stdnt (
              dep,
              m )  [static]
```

add_stdnt adds elements in the form of tuple to the set data structure

**Parameters**

| | |
|---|---|
| *dep* | department name of DeptT |
| *m* | list of all the macids in that department (string) |

#### 4.1.2.2 lst_alloc()

```
def AALst.AALst.lst_alloc (
              d )  [static]
```

lst_alloc provides with the list of macids in the department

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |

**Returns**

List of macids (string)

#### 4.1.2.3 num_alloc()

```
def AALst.AALst.num_alloc (
              d )  [static]
```

num_alloc provides with the number of allocated macids in the department

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |

**Returns**

Number of allocated students (Natural number)

The documentation for this class was generated from the following file:

- src/AALst.py

## 4.2 DCapALst.DCapALst Class Reference

An abstract data type that stores departments and it's capacity.

### Public Member Functions

- def init ()

  *init initial data structure*

### Static Public Member Functions

- def add (d, n)

  *add adds element to the set data structure*
- def remove (d)

  *remove deletes element from the set data structure*
- def elm (d)

  *elm checks if the department exists in the set*
- def capacity (d)

  *capacity checks the department size*

### Static Public Attributes

- **s** = set()

## 4.2.1 Detailed Description

An abstract data type that stores departments and it's capacity.

## 4.2.2 Member Function Documentation

#### 4.2.2.1 add()

```
def DCapALst.DCapALst.add (
              d,
              n )  [static]
```

add adds element to the set data structure

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |
| *n* | capacity of the corresponding department |

**Exceptions**

| | |
|---|---|
| *throws* | KeyError if datatypes of n doesn't matches |

#### 4.2.2.2 capacity()

```
def DCapALst.DCapALst.capacity (
              d )  [static]
```

capacity checks the department size

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |

**Returns**

number of seats available in department

**Exceptions**

| | |
|---|---|
| *throws* | KeyError if department is not found |

#### 4.2.2.3 elm()

```
def DCapALst.DCapALst.elm (
              d )  [static]
```

elm checks if the department exists in the set

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |

**Returns**

True if department exists else False

#### 4.2.2.4 remove()

```
def DCapALst.DCapALst.remove (
              d )  [static]
```

remove deletes element from the set data structure

**Parameters**

| | |
|---|---|
| *d* | department name of DeptT |

**Exceptions**

| | |
|---|---|
| *throws* | KeyError if department is not found |

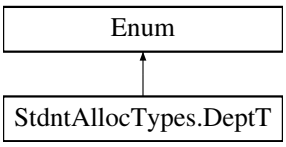
The documentation for this class was generated from the following file:

- src/DCapALst.py

## 4.3 StdntAllocTypes.DeptT Class Reference

An abstract data type that represents department name.

Inheritance diagram for StdntAllocTypes.DeptT:




### Static Public Attributes

- int **civil** = 0
- int **chemical** = 1
- int **electrical** = 2
- int **mechanical** = 3
- int **software** = 4
- int **materials** = 5
- int **engphys** = 6

### 4.3.1 Detailed Description

An abstract data type that represents department name.

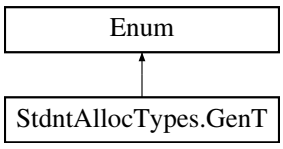
The documentation for this class was generated from the following file:

- src/StdntAllocTypes.py

## 4.4 StdntAllocTypes.GenT Class Reference

An abstract data type that represents gender.

Inheritance diagram for StdntAllocTypes.GenT:



### Static Public Attributes

- int **male** = 0
- int **female** = 1

#### 4.4.1 Detailed Description

An abstract data type that represents gender.

The documentation for this class was generated from the following file:

- src/StdntAllocTypes.py

## 4.5 SALst.SALst Class Reference

An abstract data type that stores student information.

### Public Member Functions

- def init ()
  *init initial data structure*

### Static Public Member Functions

- def add (m, i)
  *add adds the tuple of macid and student info in the set*
- def remove (m)
  *remove deletes the tuple of macid and student info from the set*
- def elm (m)
  *elm checks if the input string is in the data structure*
- def info (m)
  *info gives information about input from the data structure*
- def sort (f)
  *sort sorts the data structure*
- def average (f)
  *average gives the requested average*
- def allocate ()
  *allocate allot students based on the provided conditions*
- def **get_gpa** (m, s)

### Static Public Attributes

- **s** = set()

### 4.5.1 Detailed Description

An abstract data type that stores student information.

### 4.5.2 Member Function Documentation

#### 4.5.2.1 add()

```
def SALst.SALst.add (
              m,
              i )  [static]
```

add adds the tuple of macid and student info in the set

**Parameters**

| | |
|---|---|
| *m* | MacId of the student (string) |
| *i* | information of the student(SInfoT) |

**Exceptions**

| | |
|---|---|
| *throws* | KeyError if input i is not of the SInfoT type |

#### 4.5.2.2 allocate()

```
def SALst.SALst.allocate ( )  [static]
```

allocate allot students based on the provided conditions

Sorts the data structure (condtion->gpa more than or equal to the 4) starts alloting students with free choice as priority then students without freechoice. The limit of alloting is decided by the department capacity

**Exceptions**

| | |
|---|---|
| *Throws* | RuntimeError |

#### 4.5.2.3 average()

```
def SALst.SALst.average (
              f )  [static]
```

average gives the requested average

**Parameters**

| | |
|---|---|
| *f* | lambda function expresssion |

Gets the average of GPA only of those sets who matches with the lambda expresssion

**Returns**

average of the gpa (Numeric)

#### 4.5.2.4 elm()

```
def SALst.SALst.elm (
              m )  [static]
```

elm checks if the input string is in the data structure

**Parameters**

| | |
|---|---|
| *m* | MacId of the student (string) |

**Returns**

true if MacId is found else False

#### 4.5.2.5 info()

```
def SALst.SALst.info (
              m )  [static]
```

info gives information about input from the data structure

**Parameters**

| | |
|---|---|
| *m* | MacId of the student (string) |

**Returns**

information of the student (SInfoT)

#### 4.5.2.6 remove()

```
def SALst.SALst.remove (
              m )  [static]
```

remove deletes the tuple of macid and student info from the set

**Parameters**

| | |
|---|---|
| *m* | MacId of the student (string) |

**Exceptions**

| | |
|---|---|
| *throws* | KeyError if input m is not found in the set |

#### 4.5.2.7 sort()

```
def SALst.SALst.sort (
              f )  [static]
```

sort sorts the data structure

it uses inbuilt sorted function to sort Data structure based on their gpa and the lambda function

**Parameters**

| | |
|---|---|
| *f* | lambda function expresssion |

**Returns**

the data structure sorted according to the parameter

The documentation for this class was generated from the following file:

- src/SALst.py

## 4.6 SeqADT.SeqADT Class Reference

An abstract data type that represents a sequence (in the set)

### Public Member Functions

- def __init__ (self, x)
  *SeqADT constructor.*
- def start (self)
  *start initializes the variable i which represents index*
- def next (self)
  *next moves the index to the next by just incrementing*
- def end (self)
  *end ends the iteration*

### Public Attributes

- **s**
- **i**

### Static Public Attributes

- int **i** = 0

## 4.6.1 Detailed Description

An abstract data type that represents a sequence (in the set)

## 4.6.2 Constructor & Destructor Documentation

#### 4.6.2.1 __init__()

```
def SeqADT.SeqADT.__init__ (
              self,
              x )
```

SeqADT constructor.

takes a sequence and initializes index

**Parameters**

| | |
|---|---|
| *x* | Sequence to be used |

## 4.6.3 Member Function Documentation

#### 4.6.3.1 end()

```
def SeqADT.SeqADT.end (
              self )
```

end ends the iteration

**Returns**

true or false, if the index is the last or if the index is not the last of the sequence, respectively

#### 4.6.3.2 next()

```
def SeqADT.SeqADT.next (
              self )
```

next moves the index to the next by just incrementing

**Returns**

the value of the index

**Exceptions**

| | |
|---|---|
| *StopIteration* | - if the index goes above the length of the sequence |

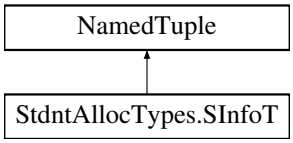
The documentation for this class was generated from the following file:

- src/SeqADT.py

## 4.7 StdntAllocTypes.SInfoT Class Reference

An abstract data type that represents all student info except macid.

Inheritance diagram for StdntAllocTypes.SInfoT:




### 4.7.1 Detailed Description

An abstract data type that represents all student info except macid.

The documentation for this class was generated from the following file:

- src/StdntAllocTypes.py

# Chapter 5

# File Documentation

## 5.1 src/AALst.py File Reference

AALst.

### Classes

- class AALst.AALst

  *An abstract data type that stores the allocated departments and students.*

### 5.1.1 Detailed Description

AALst.

**Author**

Shivam Taneja

**Date**

01/02/2019

## 5.2 src/DCapALst.py File Reference

DCapALst.

### Classes

- class DCapALst.DCapALst

  *An abstract data type that stores departments and it's capacity.*

### 5.2.1 Detailed Description

DCapALst.

**Author**

Shivam Taneja

**Date**

01/02/2019

## 5.3 src/Read.py File Reference

functions for retrieving data from file

### Functions

- def Read.load_stdnt_data (s)

  *load_stdnt_data reads in data from a file, storing it in SALst*
- def Read.load_dcap_data (s)

  *load_dcap_data reads in data from a file, storing it in DCapALst*

### 5.3.1 Detailed Description

functions for retrieving data from file

**Author**

Shivam Taneja

**Date**

01/02

### 5.3.2 Function Documentation

#### 5.3.2.1 load_dcap_data()

```
def Read.load_dcap_data (
              s )
```

load_dcap_data reads in data from a file, storing it in DCapALst

**Parameters**

| | |
|---|---|
| *s* | the name of the file to be read |

#### 5.3.2.2 load_stdnt_data()

```
def Read.load_stdnt_data (
              s )
```

load_stdnt_data reads in data from a file, storing it in SALst

**Parameters**

| | |
|---|---|
| *s* | the name of the file to be read |

## 5.4 src/SALst.py File Reference

SALst.

### Classes

- class SALst.SALst

  *An abstract data type that stores student information.*

### 5.4.1 Detailed Description

SALst.

**Author**

Shivam Taneja

**Date**

01/02/2019

## 5.5 src/SeqADT.py File Reference

SeqADt.

### Classes

- class SeqADT.SeqADT

  *An abstract data type that represents a sequence (in the set)*

#### 5.5.1 Detailed Description

SeqADt.

**Author**

Shivam Taneja

**Date**

01/02/2019

## 5.6 src/StdntAllocTypes.py File Reference

Creates custom datatypes.

### Classes

- class StdntAllocTypes.GenT

  *An abstract data type that represents gender.*
- class StdntAllocTypes.DeptT

  *An abstract data type that represents department name.*
- class StdntAllocTypes.SInfoT

  *An abstract data type that represents all student info except macid.*

#### 5.6.1 Detailed Description

Creates custom datatypes.

**Author**

Shivam Taneja

**Date**

01/02/2019

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