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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DCapALst.DCapALst 8
SALst.SALst 12
SeqADT.SeqADT 15
Enum
    StdntAllocTypes.DeptT 11
    StdntAllocTypes.GenT 11
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Chapter 2

Class Index

2.1 Class List

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

AALst.AALst
: 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

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: 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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    DCapALst 19
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src/SALst.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.

Public Member Functions

- def init ()
  init initial data structure

Static Public Member Functions

- 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** = set()

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

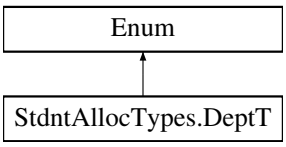
The documentation for this class was generated from the following file:

- 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.

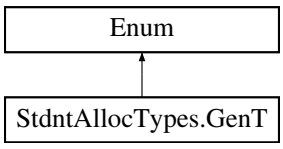
The documentation for this class was generated from the following file:

- 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**

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

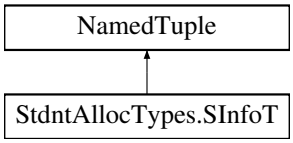
The documentation for this class was generated from the following file:

- 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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