

# geoffreyangus.github.io/CS106R

CS106R

Logistics

Login

## Class Information

### Schools:

Curitiba, BR  
Colegio SEESC São José  
Colegio Bom Jesus Centro  
Colegio Bom Jesus Lourdes

### Dates:

7 Weeks  
July 30 to September 14

### Teachers:

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### About:

CS106R is a pioneer, introductory computer science course designed for high-schoolers with no prior computer science experience. Students will learn much of the same material as Stanford's introductory computer science class, *CS106A*. However, we have tailored the notes, exercises and projects for those who speak English as a second language.

## Week 5

### Complex Objects

### Notes

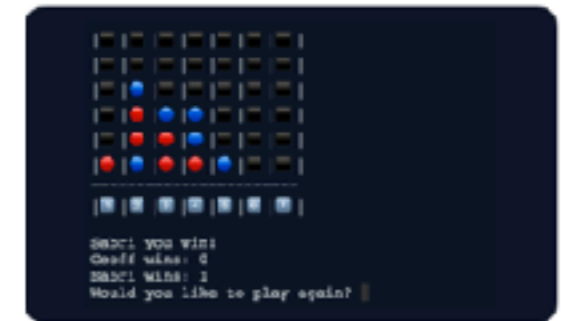
[Complex Objects](#)

### Exercises

[Caixa Eletrônico](#)

### Projects

[Connect4](#)



This week we will learn how to use objects made of objects.

### Important links:

- [Attendance \(Week 5\)](#)
- [The Python Standard Library](#)

### Learning Objectives

- 1.) Member Functions
- 2.) Attributes

Slides

# Week 6

CS106R

Sabri **Eyuboglu** & Geoffrey **Angus**

# Last week on CS106R...

Last week on CS106R...

# Complex Objects

BankAccount

class



```
account_1 = BankAccount("Geoff")
```



```
account_1 = BankAccount("Geoff")
```

```
account_1.balance = 100
```

This week on CS106R...



This week on CS106R...

# Object Functions

# Object Functions

Use and modify attributes

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

```
bot.buy_guarana()
```

# Revisiting the `Bot` class

```
geoff_bot = Bot("GeoffBot")
```

# Code

```
bot = Bot("Geoff")
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**100**

float

guaranas

**0**

int

Bot

# Code

```
bot = Bot("Geoff")
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**100**

float

guaranas

**0**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**100**

float

guaranas

**0**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot.
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**100**

float

guaranas

**0**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot



# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**100**

float

guaranas

**0**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**90**

float

guaranas

**0**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

if

bot

## Attributes

name

"Geoff"

string

age

0

int

Charge

90

float

guaranas

0

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

```
if bot .
```

bot

## Attributes

name

"Geoff"

string

age

0

int

Charge

90

float

guaranas

0

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")  
bot.go_to_store()  
if bot.has_guarana():
```

bot

## Attributes

name

"Geoff"  
string

age

0  
int

Charge

90  
float

guaranas

0  
int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")  
bot.go_to_store()  
  
if bot.has_guarana():  
    bot.
```

bot

## Attributes

name

"Geoff"  
string

age

0  
int

Charge

90  
float

guaranas

0  
int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")  
bot.go_to_store()  
  
if bot.has_guarana():  
    bot.buy_guaranas(num)
```

bot

## Attributes

name  
"Geoff"  
string

age  
0  
int

Charge  
90  
float

guaranas  
0  
int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

```
if bot.has_guarana():
```

```
    bot.buy_guaranas(10)
```

bot

## Attributes

name

"Geoff"

string

age

0

int

Charge

90

float

guaranas

0

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot



# Code

```
bot = Bot("Geoff")
```

```
bot.go_to_store()
```

```
if bot.has_guarana():
```

```
    bot.buy_guaranas(10)
```

bot

## Attributes

name

**"Geoff"**

string

age

**0**

int

Charge

**85**

float

guaranas

**10**

int

## Functions

go\_to\_store()

has\_guarana()

buy\_guarana()

buy\_guaranas(num)

Bot

# Object Functions

Use and modify attributes

```
bot = Bot("Geoff")
```

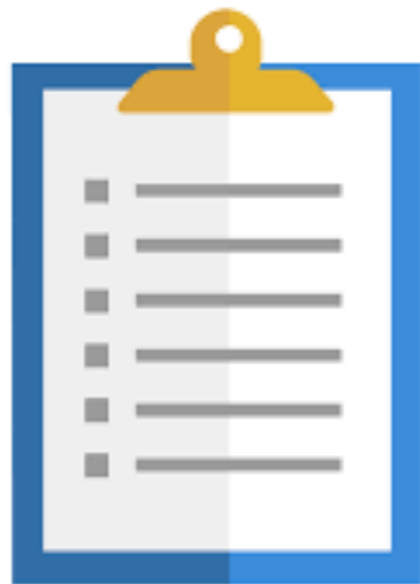
```
bot.go_to_store()
```

```
bot.buy_guarana()
```

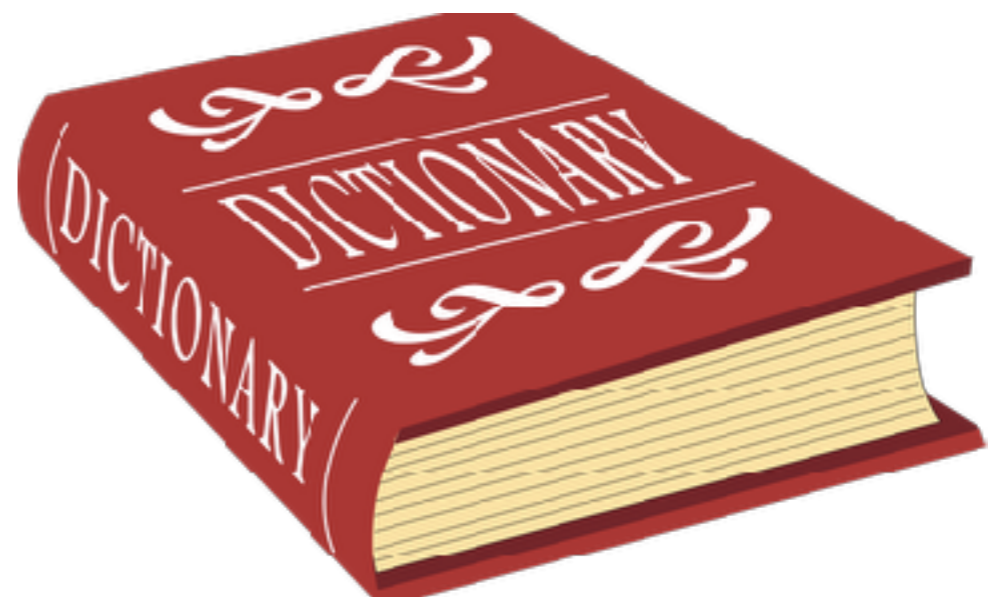
Next:

# Collection Classes

List

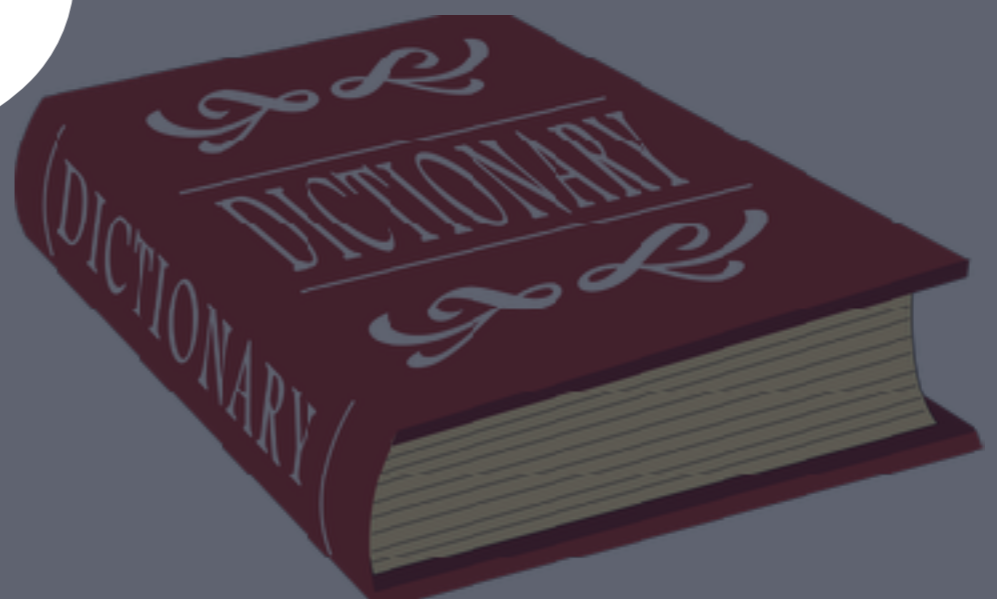
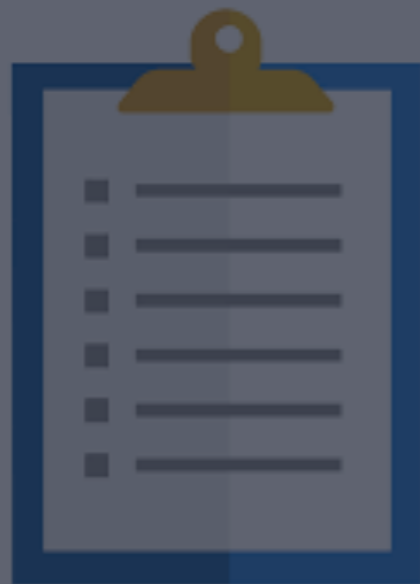


Dict

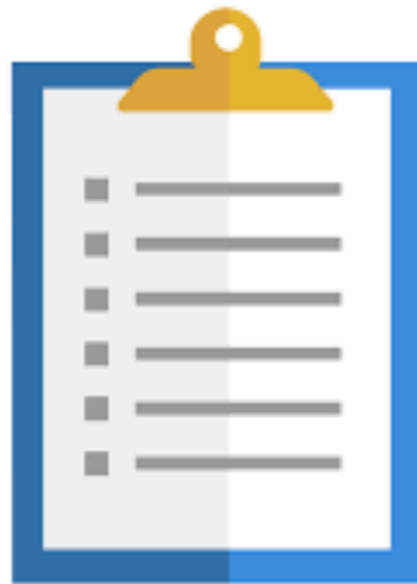


List

Dict



# List



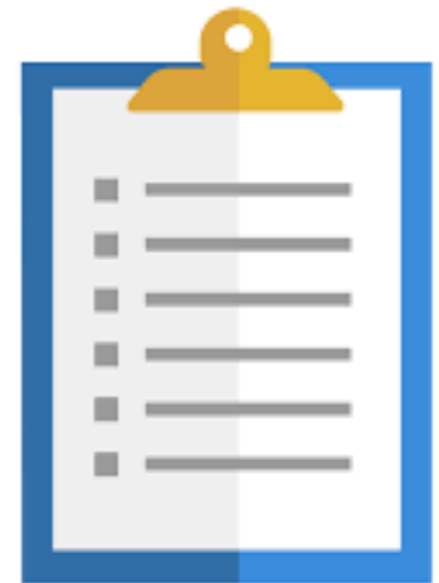
# List

**Instagram Followers**

**Contact List**

**Playlists**

**Online Shopping Carts**



# List

## Code

```
shopping_list = List()
```

shopping\_list

## Attributes

length

0

int

items

Index

Items

list

## Functions

add(obj)

get(index)

delete(index)

Bot



# List

## Code

```
shopping_list = List()
```

```
shopping_list
```

shopping\_list

## Attributes

length

0

int

items

Index

Items

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list .
```

shopping\_list

## Attributes

length

0

int

items

Index

Items

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add(obj)
```

shopping\_list

## Attributes

length

0

int

items

Index

Items

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

shopping\_list

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")
```

## Attributes

length

0

int

items

Index

Items

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")
```

shopping\_list

## Attributes

length

1

int

items

Index

0

Items

"Guarana"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.
```

shopping\_list

## Attributes

length

1

int

items

Index

0

Items

"Guarana"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add(obj)
```

shopping\_list

## Attributes

length

1

int

items

Index

0

Items

"Guarana"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

shopping\_list

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")
```

## Attributes

length

1

int

items

Index

0

Items

"Guarana"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot



# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")
```

shopping\_list

## Attributes

length

2

int

items

Index

0

"Guarana"  
string

1

"Bread"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")
```

shopping\_list

## Attributes

length

2

int

items

Index

0

1

Items

"Guarana"  
string

"Bread"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

shopping\_list

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")
```

## Attributes

length

4

int

items

Index

Items

0

"Guarana"  
string

1

"Bread"  
string

2

"Pasta"  
string

3

"Paçoca"  
string

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()
shopping_list.add("Guarana")
shopping_list.add("Bread")
shopping_list.add("Pasta")
shopping_list.add("Paçoca")
fav = shopping_list
```

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")  
fav = shopping_list.get(2)
```

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")  
fav = shopping_list.get(2)  
print(fav)
```

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)


delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")  
fav = shopping_list.get(2)  
print(fav)
```

 Pasta

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")  
  
for food in shopping_list:
```

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)

delete(index)

Bot



# List

## Code

```
shopping_list = List()
shopping_list.add("Guarana")
shopping_list.add("Bread")
shopping_list.add("Pasta")
shopping_list.add("Paçoca")

for food in shopping_list:
    print(food)
```

shopping\_list

## Attributes

length

4

int

items

| Index | Items               |
|-------|---------------------|
| 0     | "Guarana"<br>string |
| 1     | "Bread"<br>string   |
| 2     | "Pasta"<br>string   |
| 3     | "Paçoca"<br>string  |

list

## Functions

add(obj)

get(index)

delete(index)

Bot

# List

## Code

```
shopping_list = List()  
shopping_list.add("Guarana")  
shopping_list.add("Bread")  
shopping_list.add("Pasta")  
shopping_list.add("Paçoca")  
  
for food in shopping_list:  
    print(food)
```

```
Guarana  
Bread  
Pasta  
Paçoca
```

shopping\_list

## Attributes

length

4

int

items

Index

0

"Guarana"  
string

1

"Bread"  
string

2

"Pasta"  
string

3

"Paçoca"  
string

list

## Functions

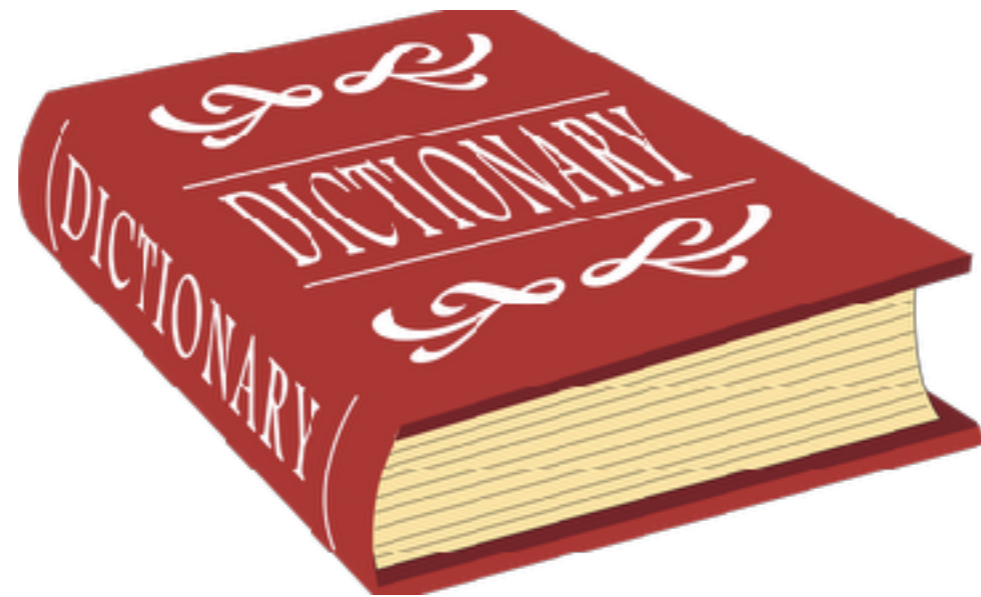
add(obj)

get(index)

delete(index)

Bot

Dict



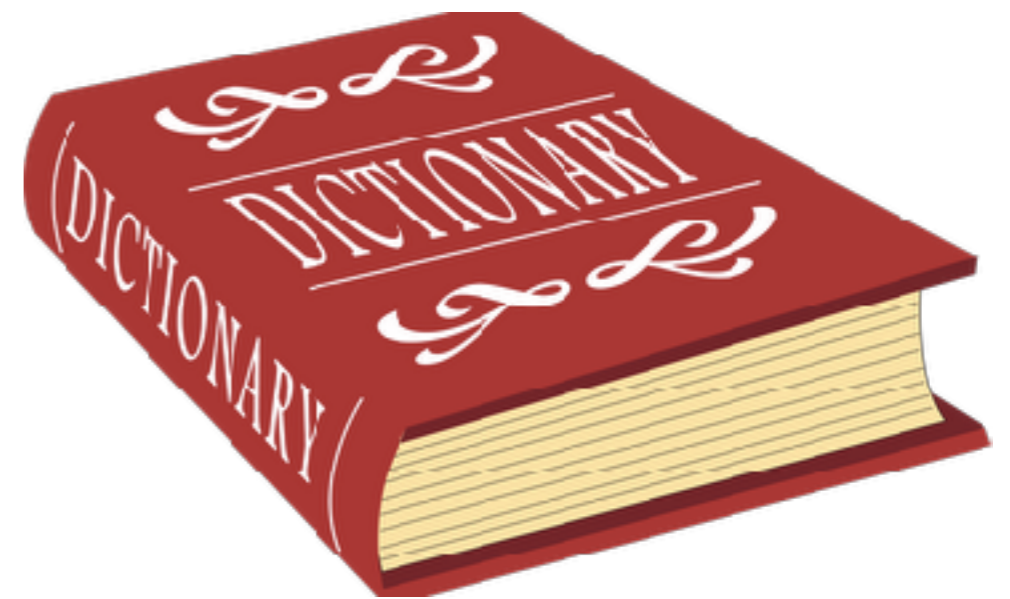
Dict

**Hospital Records**

**Identity Confirmation**

**Flight Information**

**File Storage**



# Dict

birthdays

## Code

```
birthdays = Dict()
```

## Attributes

length

0

int

items

Key

Value

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

birthdays

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)
```

## Attributes

length

0

int

items

Key

Value

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

birthdays

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)
```

## Attributes

length

1

int

items

Key

Value

"Geoff"  
string

22  
int

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

birthdays

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)
```

## Attributes

length

1

int

items

Key

Value

"Geoff"  
string

22  
int

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict



# Dict

birthdays

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)
```

## Attributes

length

2

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)
```

birthdays

## Attributes

length

2

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

birthdays

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)
```

## Attributes

length

3

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |
| "Drake"<br>string | 31<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)  
print(birthdays.get("Drake"))
```

birthdays

## Attributes

length

3

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |
| "Drake"<br>string | 31<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)  
print(31)
```

birthdays

## Attributes

length

3

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |
| "Drake"<br>string | 31<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)  
print(birthdays.get("Drake"))
```

birthdays

## Attributes

length

3

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |
| "Drake"<br>string | 31<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)  
print(birthdays.get("Drake"))  
birthdays.delete("Drake")
```

birthdays

## Attributes

length

3

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |
| "Drake"<br>string | 31<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict

# Dict

## Code

```
birthdays = Dict()  
birthdays.add("Geoff", 22)  
birthdays.add("Sabri", 22)  
birthdays.add("Drake", 31)  
print(birthdays.get("Drake"))  
birthdays.delete("Drake")
```

birthdays

## Attributes

length

2

int

items

| Key               | Value     |
|-------------------|-----------|
| "Geoff"<br>string | 22<br>int |
| "Sabri"<br>string | 22<br>int |

dict

## Functions

add(key, value)

get(key)

delete(key)

Dict