

[301] JSON

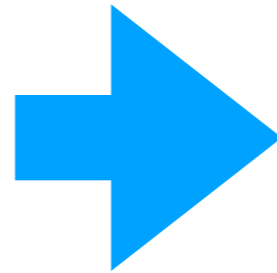
Tyler Caraza-Harter

Python Data Structures and File Formats

Python

```
[  
  ["name", "x", "y"],  
  ["alice", 100, 150],  
  ["bob", -10, 80]  
]
```

list of lists



File

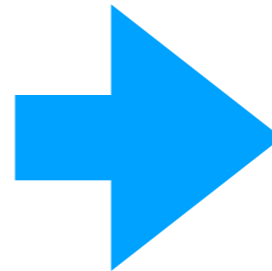


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]
```

list of lists



File

```
name,x,y  
alice,100,150  
bob,-10,80
```

CSV file

**We can use CSV files to store
data we would want in lists of lists**

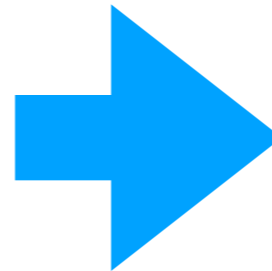
Python Data Structures and File Formats

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  ["bob", -10, 80]  
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list of lists

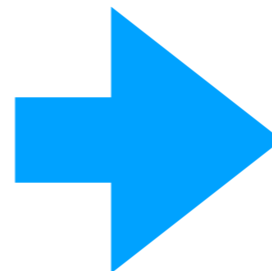


```
name,x,y  
alice,100,150  
bob,-10,80
```

CSV file

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10,20,19]},  
  "bob": {  
    "age": 45,  
    "scores": [15,23,17,15]}  
}
```

dict of dicts

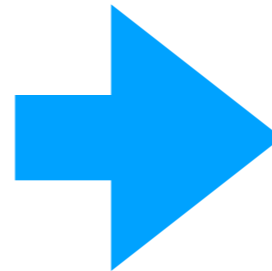


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```

list of lists



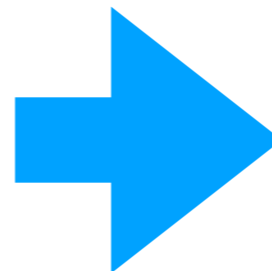
File

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CSV file

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{  
  "alice": {  
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dict of dicts



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    "scores": [10,20,19]},  
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    "age": 45,  
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}
```

JSON file

Python Data Structures and File Formats

Python

File

JSON files look almost identical to Python code for data structures!

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[  
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]
```

list of lists



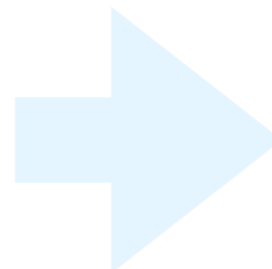
```
name,x,y  
alice,100,150  
bob,-10,80
```

CSV file



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  "alice": {  
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    "scores": [10,20,19]},  
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dict of dicts



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```

JSON file

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```
[  
  ["name", "x", "y"],  
  ["alice", 100, 150],  
  ["bob", -10, 80]  
]
```

list of lists

dicts use curly braces

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
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```

dict of dicts

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alice,100,150  
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CSV file

```
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```

JSON file

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  ["bob", -10, 80]  
]
```

list of lists

keys are separated from values with a colon

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
}
```

dict of dicts

```
name,x,y  
alice,100,150  
bob,-10,80
```

CSV file

```
{  
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JSON file

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```
[  
  ["name", "x", "y"],  
  ["alice", 100, 150],  
  ["bob", -10, 80]  
]
```

list of lists

lists use square brackets

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
}
```

dict of dicts

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alice,100,150  
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CSV file

```
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    "scores": [15, 23, 17, 15]}  
}
```

JSON file

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```
[  
  ["name", "x", "y"],  
  ["alice", 100, 150],  
  ["bob", -10, 80]  
]
```

list of lists

strings are in quotes

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
}
```

dict of dicts

```
name,x,y  
alice,100,150  
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```

CSV file

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
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    "age": 45,  
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}
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JSON file

Python Data Structures and File Formats

Python

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JSON files look almost identical to Python code for data structures!

```
[  
  ["name", "x", "y"],  
  ["alice", 100, 150],  
  ["bob", -10, 80]  
]
```

list of lists

integers look like integers

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
}
```

dict of dicts

```
name,x,y  
alice,100,150  
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CSV file

```
{  
  "alice": {  
    "age": 40,  
    "scores": [10, 20, 19]},  
  "bob": {  
    "age": 45,  
    "scores": [15, 23, 17, 15]}  
}
```

JSON file

JSON

Stands for **JavaScript Object Notation**

- JavaScript is a language for web development
- JSON was developed as a way for JavaScript programs to store/share data
- JavaScript is similar to Python, which is why JSON looks like Python code

JSON

Stands for **JavaScript Object Notation**

- JavaScript is a language for web development
- JSON was developed as a way for JavaScript programs to store/share data
- JavaScript is similar to Python, which is why JSON looks like Python code

Minor JavaScript vs. Python differences entail gotchas:

	Python	JSON
Booleans	True, False	true, false
No value	None	null
Quotes	Single (') or double (")	Only double (")
Commas	Extra allowed: [1,2,]	No extra: [1,2]
Keys	Any type: {1: "one"}	Str only: {"1": "one"}

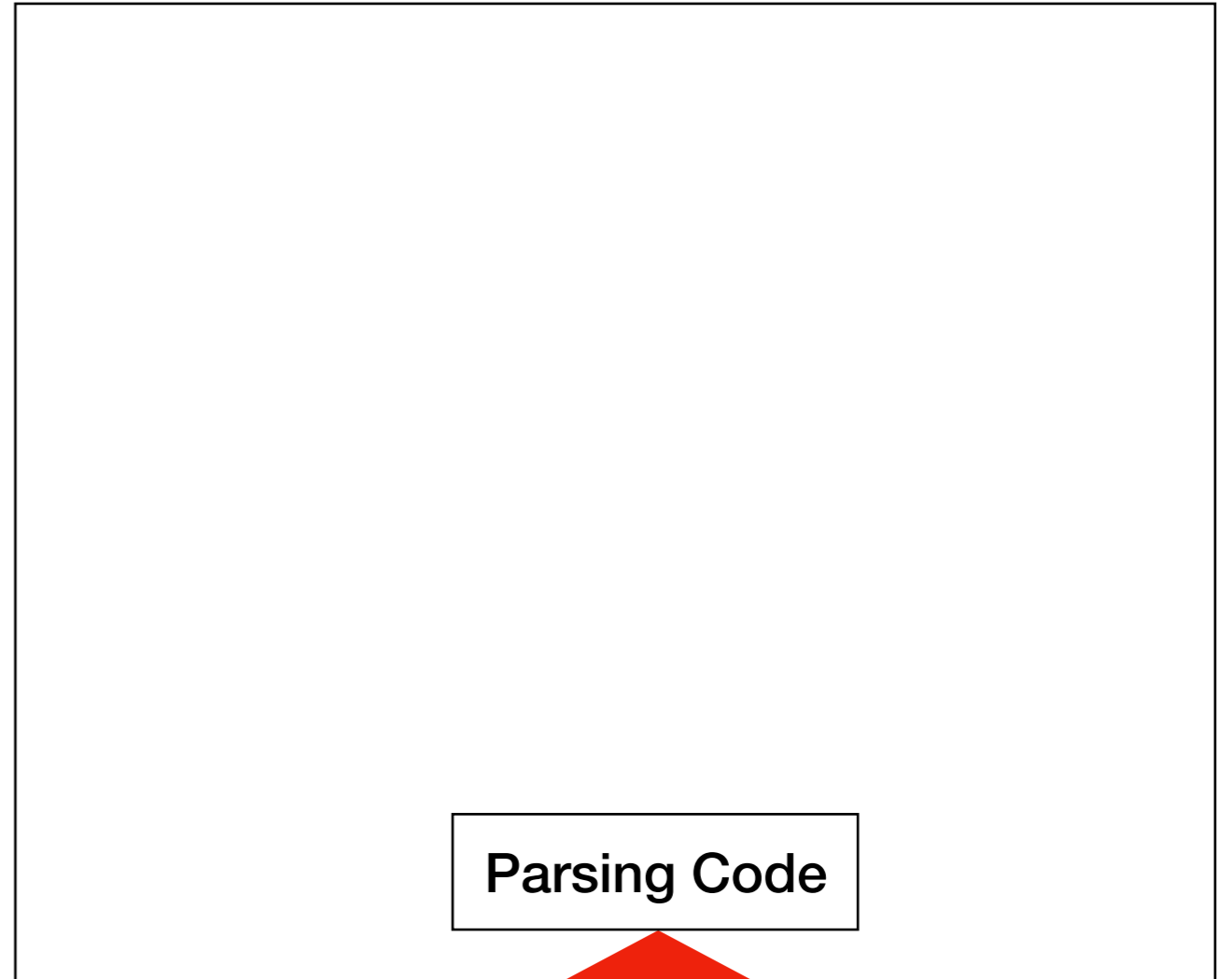
Reading JSON Files

JSON file saved somewhere

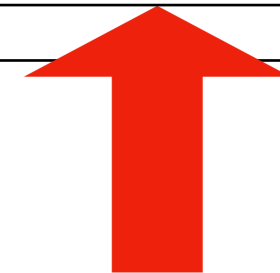
```
{  
  "alice": 10,  
  "bob": 12,  
  "cindy": 15  
}
```

Reading JSON Files

Python Program



Parsing Code



JSON file saved somewhere

```
{  
  "alice": 10,  
  "bob": 12,  
  "cindy": 15  
}
```

Reading JSON Files

Python Program

```
dict {"alice":10, "bob":12,  
      "cindy":15}
```

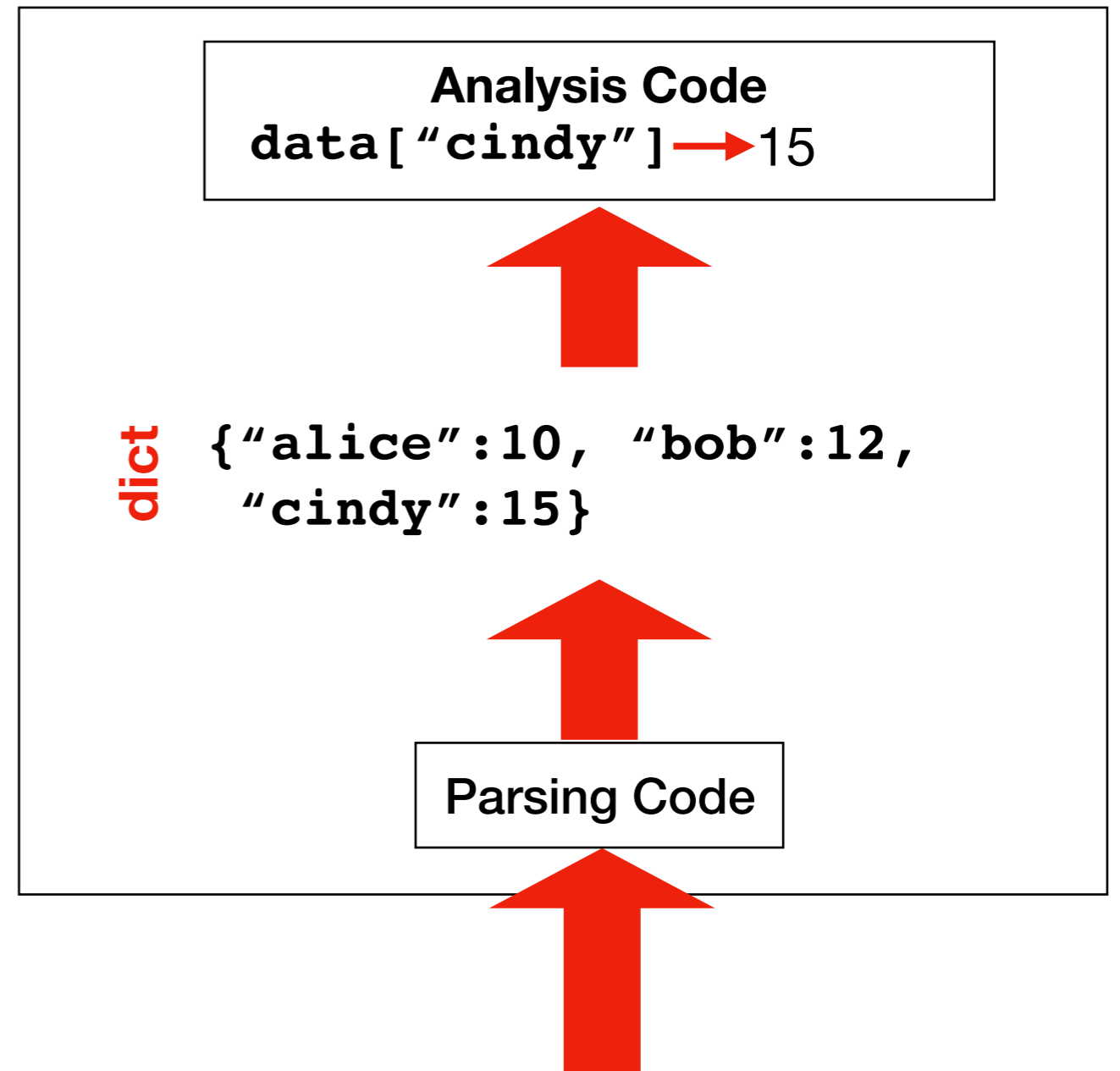
Parsing Code

JSON file saved somewhere

```
{  
  "alice": 10,  
  "bob": 12,  
  "cindy": 15  
}
```


Reading JSON Files

Python Program

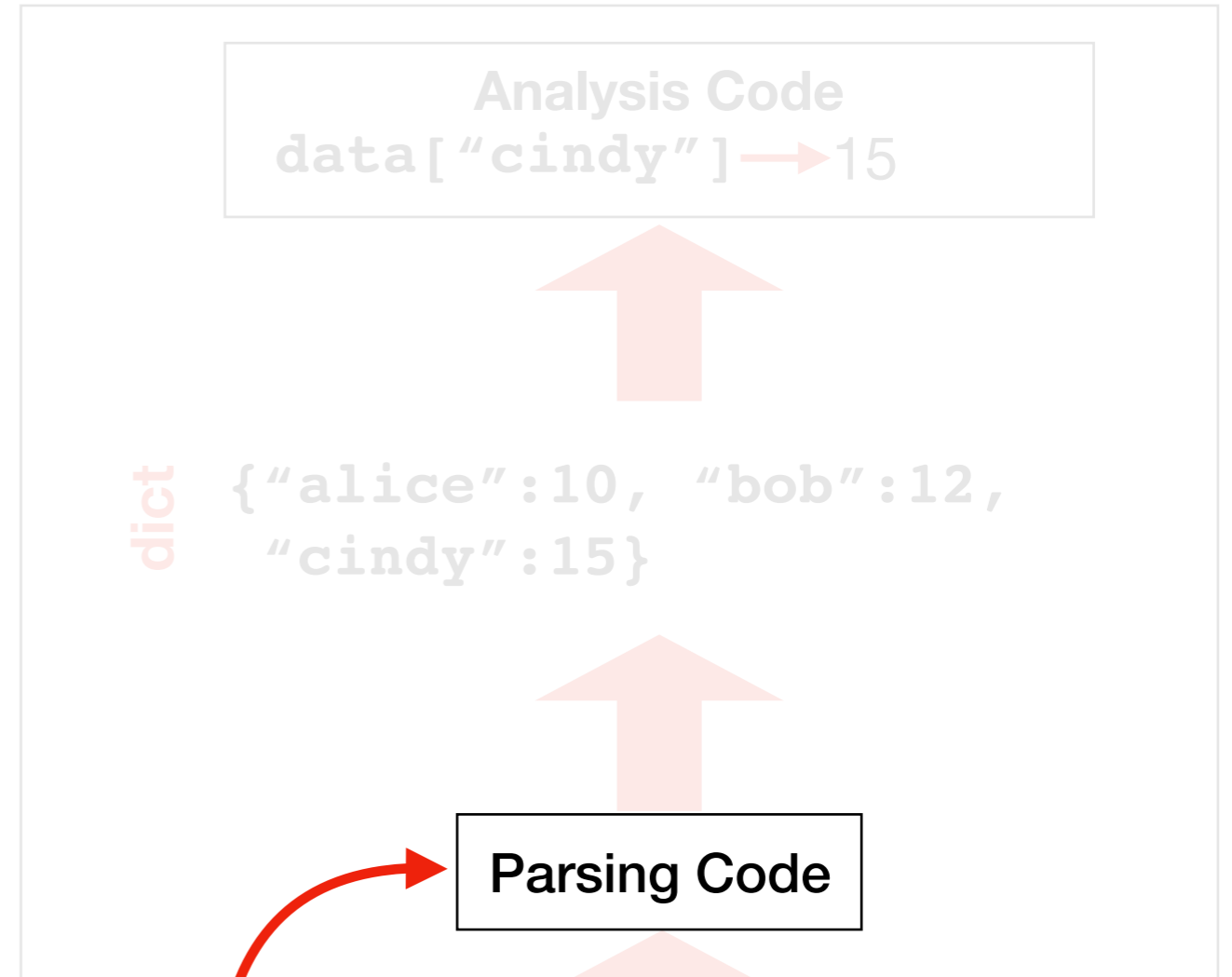


JSON file saved somewhere

```
{  
  "alice": 10,  
  "bob": 12,  
  "cindy": 15  
}
```

Reading JSON Files

Python Program



What does this look like?

JSON file saved somewhere

```
{  
  "alice": 10,  
  "bob": 12,  
  "cindy": 15  
}
```

Reading JSON Files

```
import json
def read_json(path):
    with open(path) as f:
        return json.load(f)
```

Python Program

Analysis Code
`data["cindy"] → 15`

dict
`{"alice": 10, "bob": 12, "cindy": 15}`

Parsing Code

What does this look like?

JSON file saved somewhere

```
{
  "alice": 10,
  "bob": 12,
  "cindy": 15
}
```

Reading JSON Files

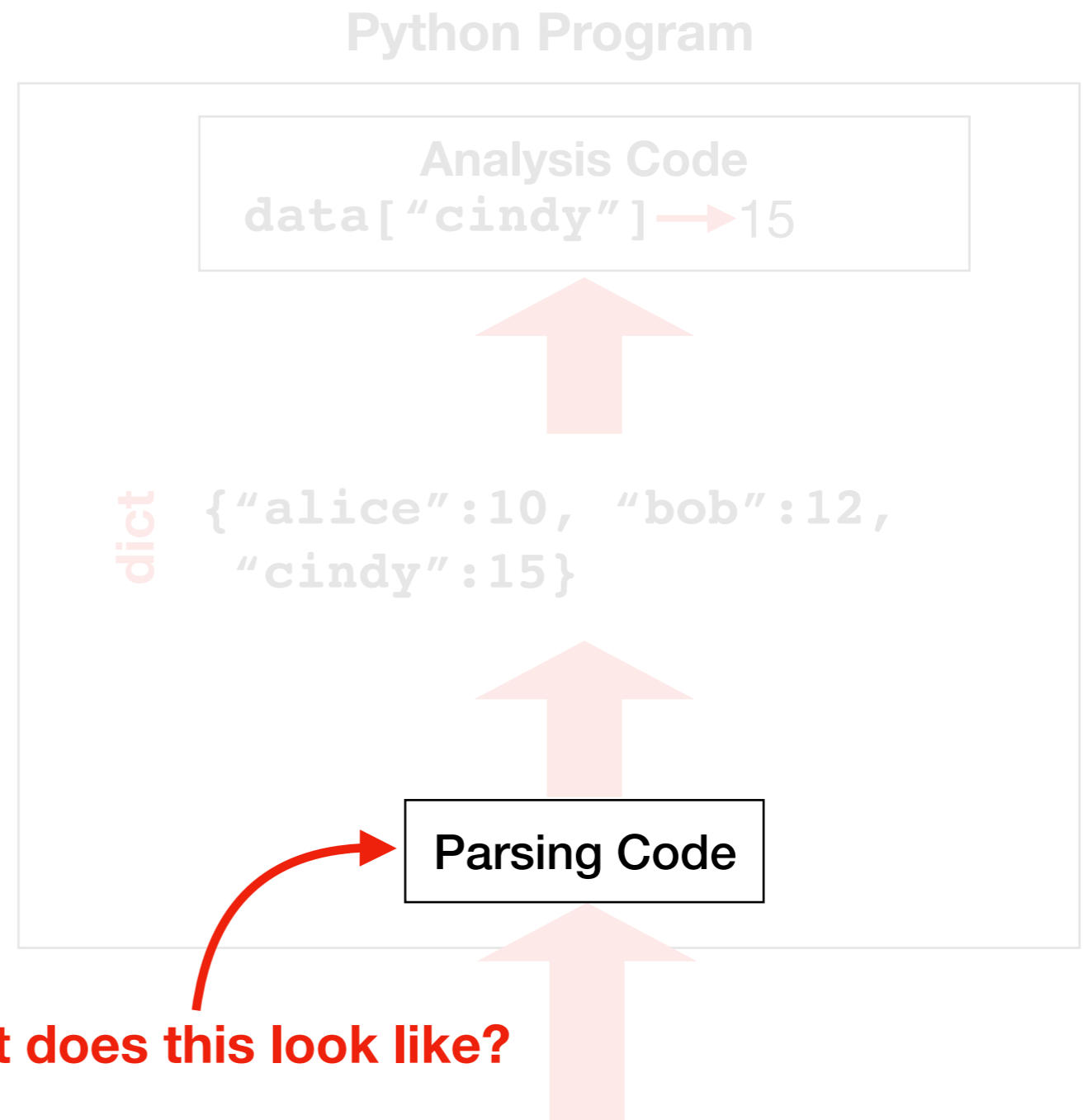
```
import json
def read_json(path):
    with open(path) as f:
        return json.load(f)
```

what about writing?

JSON file saved somewhere

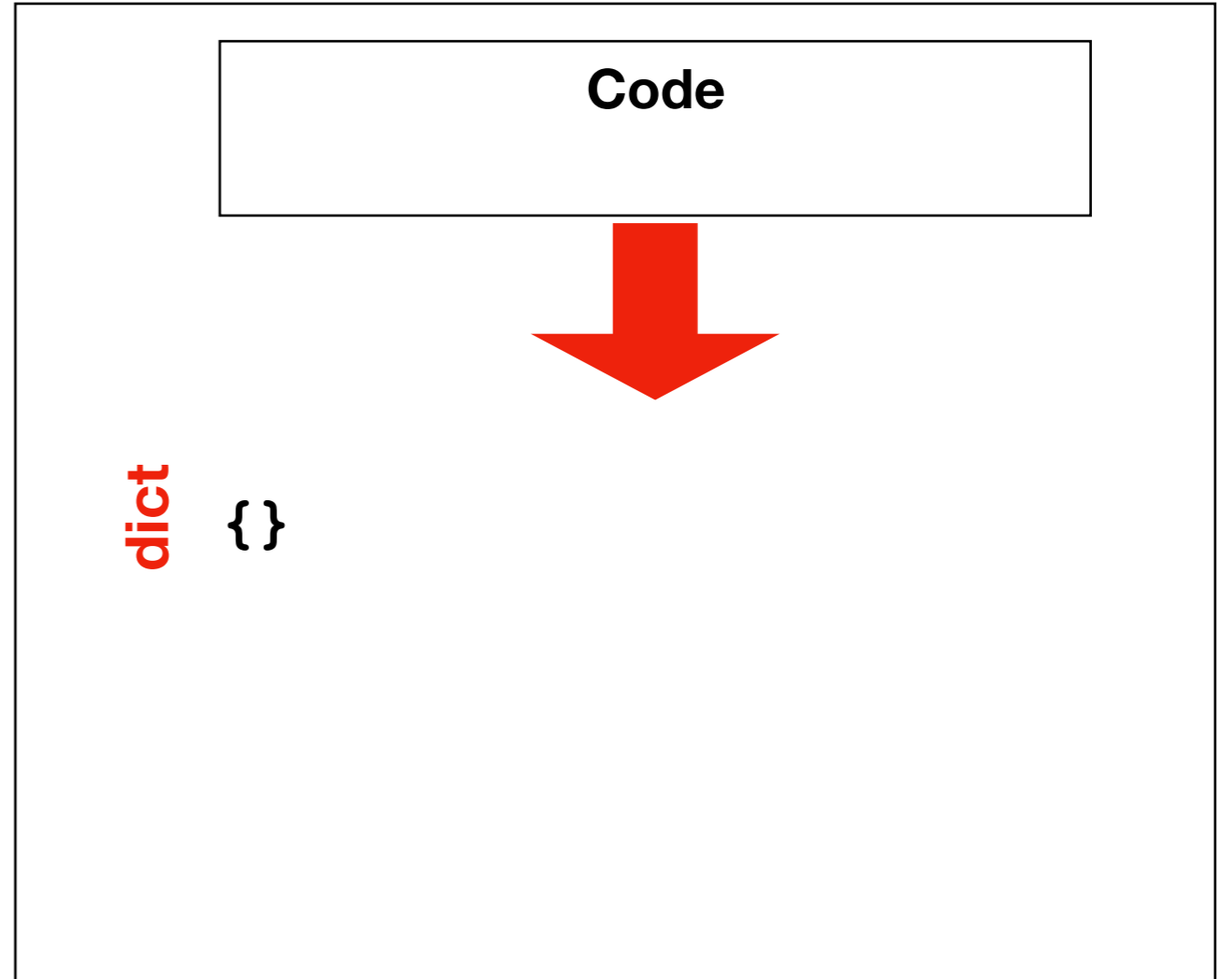
```
{
  "alice": 10,
  "bob": 12,
  "cindy": 15
}
```

What does this look like?



Writing JSON Files

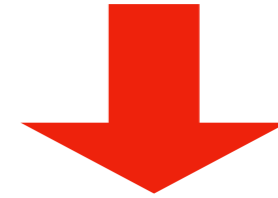
Python Program



Writing JSON Files

Python Program

Code
`data["cindy"] = 15`



dict `{"cindy": 15}`

Writing JSON Files

Python Program

Code
`data["cindy"] = 15`



dict `{"cindy": 15}`



Serialization Code

Writing JSON Files

Python Program

Code
`data["cindy"] = 15`

dict `{"cindy": 15}`

Serialization Code

JSON file saved somewhere

```
{  
  "cindy": 15  
}
```


Writing JSON Files

Python Program

```
Code  
data["cindy"] = 15
```

dict
{"cindy": 15}

Serialization Code

What does this look like?

JSON file saved somewhere

```
{  
  "cindy": 15  
}
```

Writing JSON Files

```
import json
```

```
def write_json(path, data):  
    with open(path, 'w') as f:  
        return json.dump(data, f, indent=2)
```

Python Program

Code
`data["cindy"] = 15`

dict
`{"cindy": 15}`

Serialization Code

What does this look like?

JSON file saved somewhere

```
{  
  "cindy": 15  
}
```