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Programming and Data Structures with Python

Lists vs dictionaries

Extracting unique elements from a list

- List version : Sort & look for duplicates adjacent to each other — $n \log n$
- Create keys from elements — n

Intersection

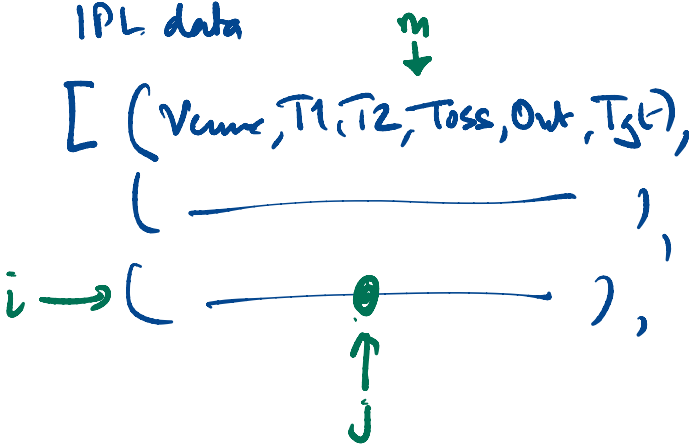
- Sort & merge — $n \log n$
- Create keys from L1, "probe" dictionary — n

Nested collections

List of lists

List of tuples

IPL data



m[i][j]

not

m[i,j]

List of dict

Dict of list

d[k]

l[i]

t[j]

Venues where each team plays as team1

venues[team] → { .. }

matchlist

```
venues = {}
for m in matchlist:
    v, t1 = m[0], m[1]
    if t1 in venues:
        venues[t1][v] = 1
    else:
        venues[t1] = {}
        venues[t1][v] = 1
```

venues[t1] = {v:1}

venues → dict of dict

Want

dict of list

```
finalvenues = {}
for t in venues:
    finalvenue[t] = (list(venues[t]))
```

sorted

venues[t].keys()

For t1 & t2

```
venues = {}
for m in matchlist:
    v, t1, t2 = m[0], m[1], m[2]
    if t1 in venues:
        venues[t1][v] = 1
    else:
        venues[t1] = {v: 1}
```

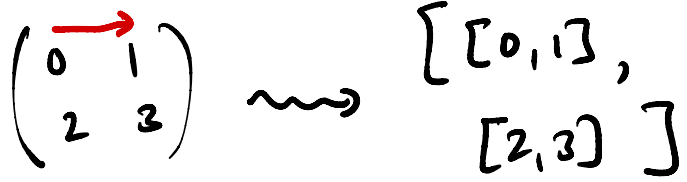
Avoid duplicate code!

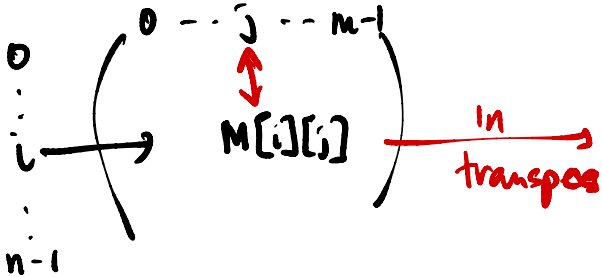
```
if t2 in venues:
    [same code]
```

for x in t1, t2 :

Matrices

List of list of numbers





MT[j][i]

Have MT[j][0] .. MT[j][i-1]

MT[j] = [M^T_{j0}, .. $M^T_{j,i-1}$]

.append(M[i][j])

Strings

Seq of characters

"hello"

'hello'

"CMI's classrooms"

'He said "Hi"'

Triple quote (3 single quotes)

'''He said, "Wow, CMI's classrooms"'''

Strings are sequences — like lists, tuples ..

```
s = "hello"
for c in s:
    {
```

No distinct datatype for a single letter

```
l=[0,1,2]
for x in l:
```

x is 0	vs [0]
1	[1]
2	[2]

```
s="abc"
for c in s:
```

c is "a"
"b"
"c"

Could be a problem

l.append(v)

vs

l.extend([v])

s.append("c")

s.extend("c")

But this is not allowed anyway!

Like tuples, strings cannot be updated in place.

Individual positions are indexed

s = "hello"

s[0] → "h"

s[3] → "l"

s[4] → "o"

s[4] = "!" ✗

s = s[:4] + "!"