

IN1000 – SEMINAR 3

- Enkle og nøstede lister
 - Mengder
 - mapping



HVA ER EN LISTE?
HVA SLAGS TING
GJØR DU MED
F.EKS. EN
HANDLELISTE
ELLER
GJØREMÅLSLISTE
??

Liste (enkle)

- Når man skal lagre på flere verdier samlet
- Dynamisk
- Man kan ha lister med forskjellige elementer:
 - *tallListe* = [2, 4, 6, 7]
 - *navnListe* = ["Anne", "Per", "Lisa"]
 - *tomListe* = []

Oppgave 1:

Hvor mange elementer er det i listene?

```
liste = [0]
```

```
liste1 = [1, 2, 3]
```

```
liste2 = [3, 3, 5, 7]
```

```
liste3 = ["A", "BC", "D", "E", "F"]
```

```
liste4 = ["mange elementer i denne listen"]
```

```
liste5 = []
```

Oppgave 2

2.1 Hva ligger på indexene?

liste3 [4]

liste1 [0]

liste4 [1]

liste3 [5]

2.2 På hvilken index ligger:

5 (i liste2):

“BC” (i liste3):

1 (i liste1):

“E” (i liste3):

2.3 Tegn opp hvordan liste3 ser ut.

```
liste = [0]
```

```
liste1 = [1, 2, 3]
```

```
liste2 = [3, 3, 5, 7]
```

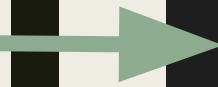
```
liste3 = ["A", "BC", "D", "E", "F"]
```

```
liste4 = ["mange elementer i denne listen"]
```

```
liste5 = []
```

Nyttige listeoperasjoner

- `len(<liste>)`
 - *Gir lengden på listen*
- `liste.insert(index, element)`
 - *Setter inn element på angitt indeks*
- `liste.append(element)`
 - *Legger til elementet bakerst i listen*
- `liste.remove(element)`
 - *Fjerner angitt element fra lista*
- `list.pop()`
 - *Fjerne (og returnerer) elementet på angitt indeks*
 - *Hvis ingen argumenter er gitt fjerner den automatisk det siste*
 - *PS: pop(-1) fjerner det siste elementet, pop(-2) fjerner det nest siste elementet osv. :))*



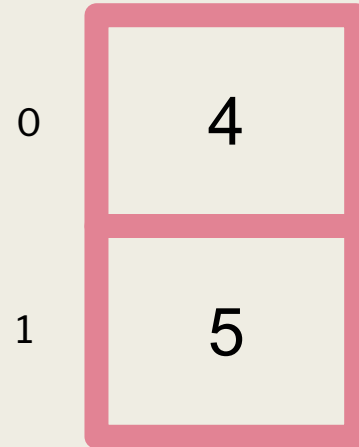
```
liste = [4,5]
```

```
liste.append(7)
```

```
liste.insert(1,5)
```

```
liste.remove(5)
```

```
liste.pop(-2)
```



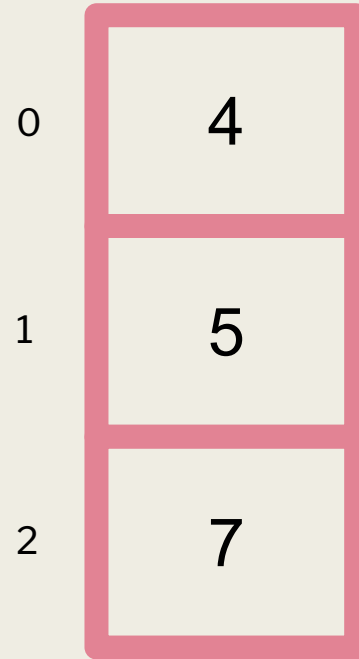
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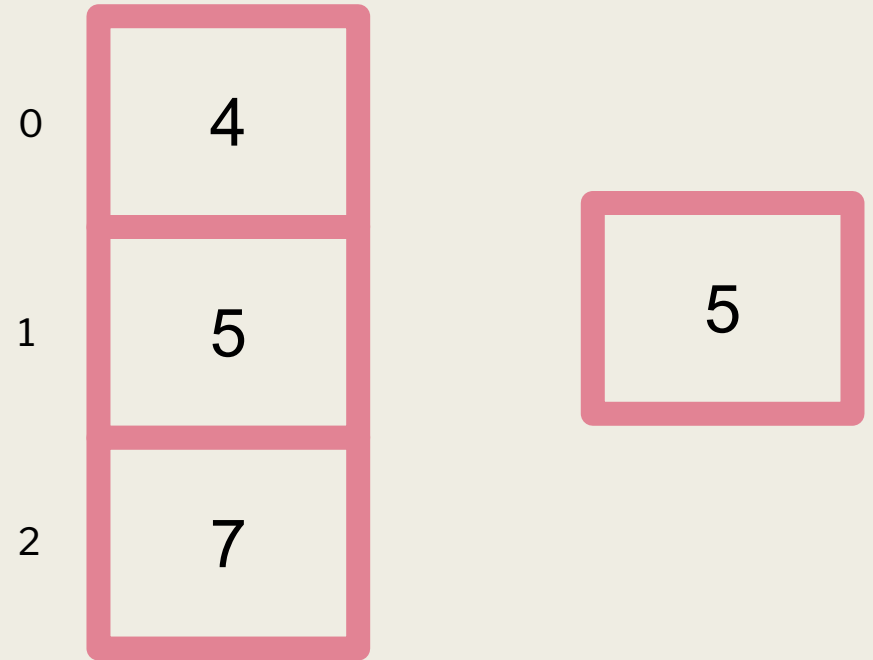

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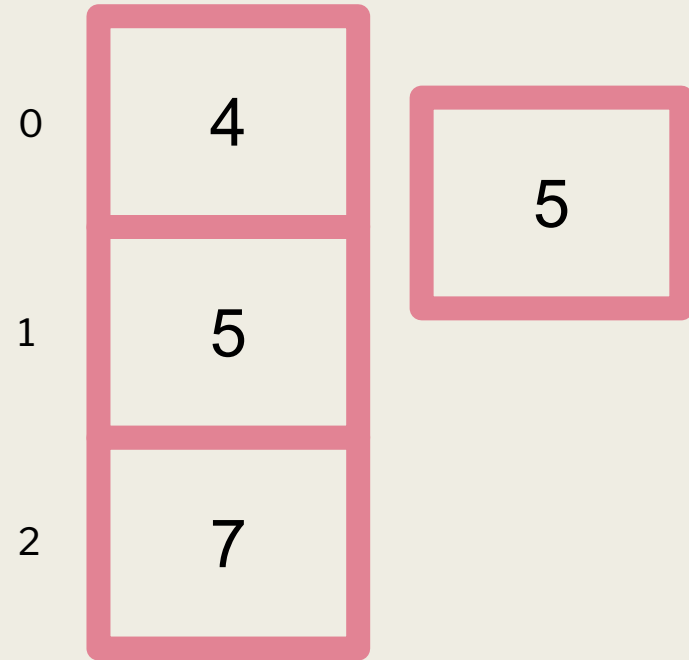
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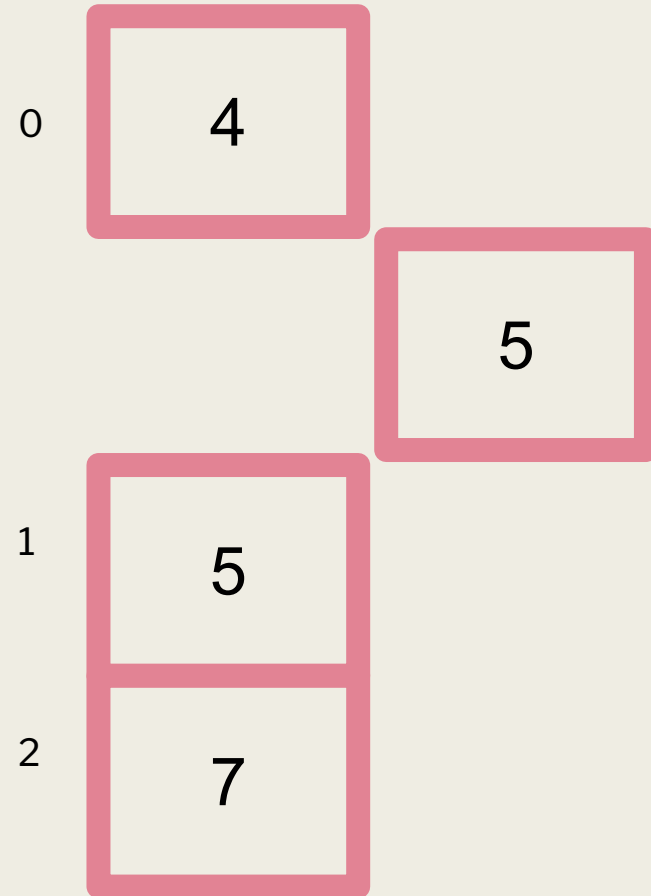
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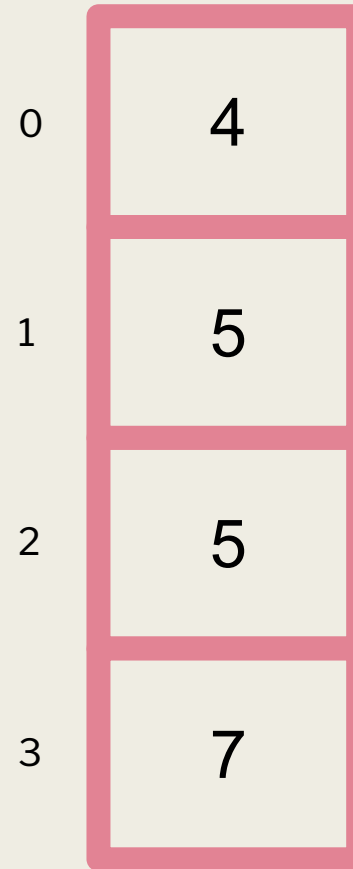
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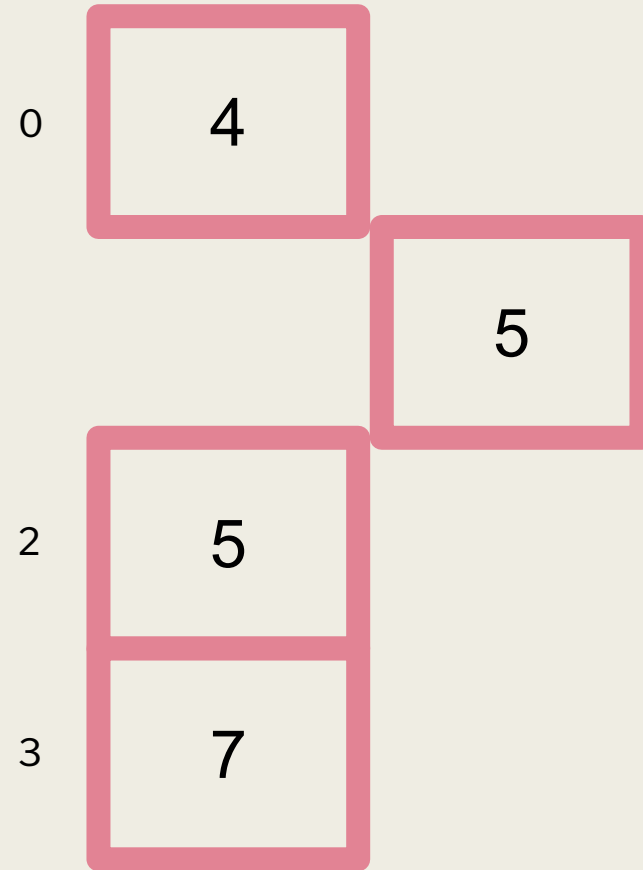
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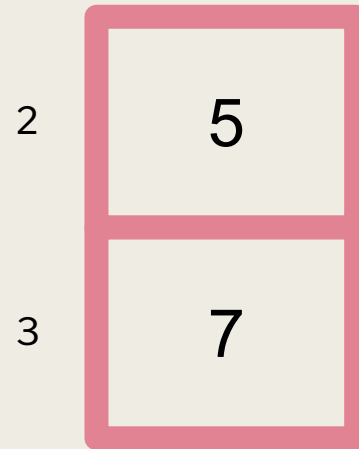
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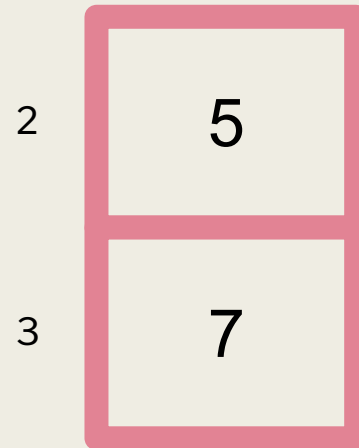
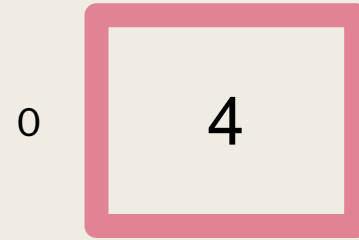
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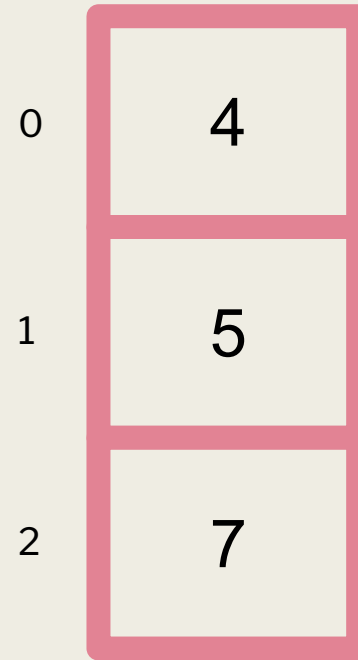
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liste.pop(-2)
```



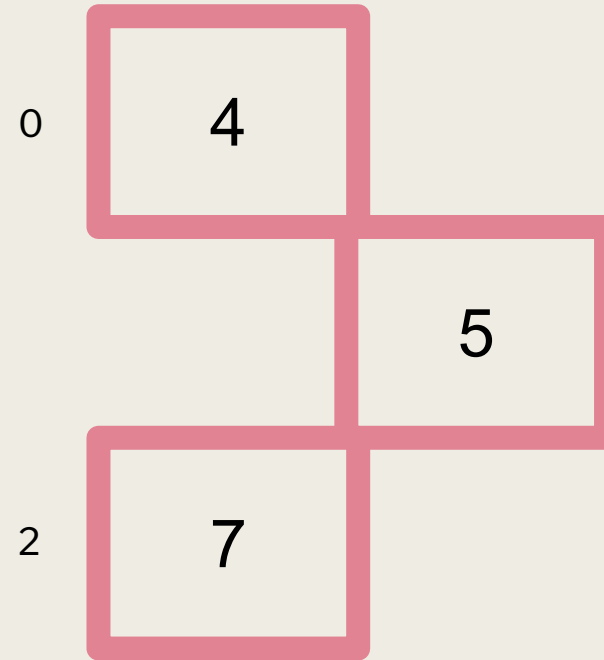

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liste.insert(1,5)
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```
liste.remove(5)
```

```
liste.pop(-2)
```



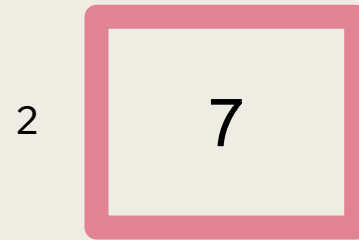
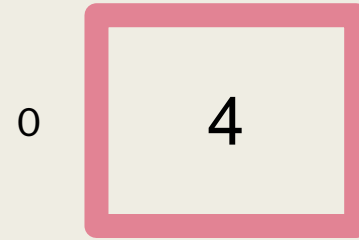
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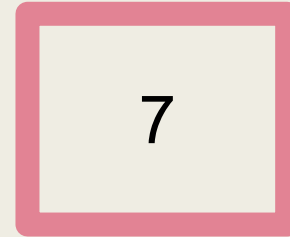
```
liste.remove(5)
```

```
liste.pop(-2)
```

0



2



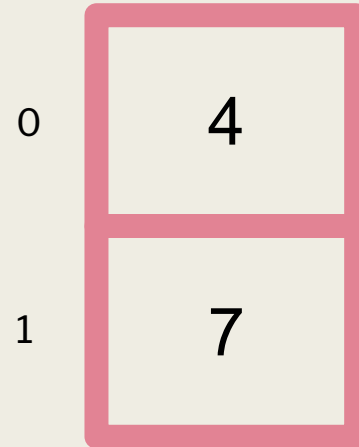
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liste.append(7)
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liste.insert(1,5)
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liste.remove(5)
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```
liste.pop(-2)
```



Oppgave 3

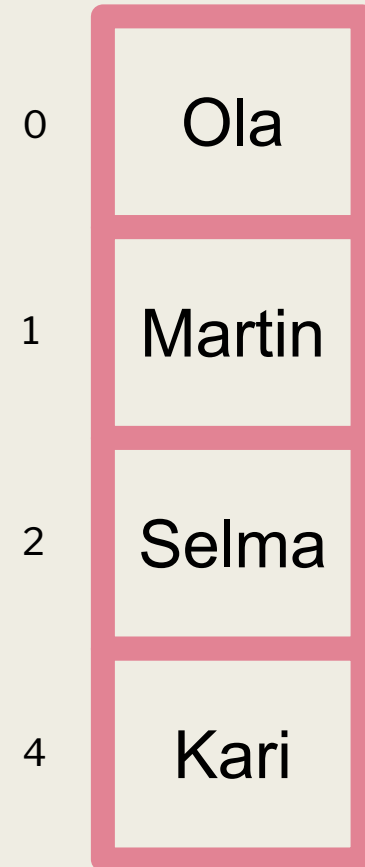
Skriv en liste navn med 3 navn “Ola”, “Martin” og “Selma”. Legg deretter “Kari” til bakerst i lista.

Tegn opp hvordan listen ser ut nå.

Skriv ut Martin sitt navn ved hjelp av indeksen det ligger på. Legg til to navn forrest i listen, navnene velger du selv.

Tegn opp hvordan listen ser ut nå

```
navn = ["Ola", "Martin", "Selma"]  
navn.append("Kari")
```



```
navn = ["Ola", "Martin", "Selma"]
```

```
navn.append("Kari")
```

```
print(navn[1])
```

```
navn.insert(0, "navn1")
```

```
navn.insert(0, "navn2")
```

0 navn2

1 navn1

2 Ola

4 Martin

5 Selma

6 Kari

Nøstede lister

Vi har en mindre bag med “toalettsaker”, vår første liste:

toalettsaker = [“tannborste”, “haarborste”, “tannkrem”]

I tillegg har vi en mindre bag med klær:

klaer = [“jakke”, “bukse”, “sokker”, “undertoy”]


Og til slutt en liten bag med diverse:

div = [“kamera”, “lommebok”, “pass”, “mobillader”]

For å samle alle småbaggene når vi skal på tur legger vi dem i en koffert:

koffert = [toalettsaker, klaer, div]

Oppgave 4 Hvordan vil utskriften se ut? Og hvordan kan vi tegne opp denne ?



```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```

0 tannborste

1 haarborste

2 tannkrem

```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```

0 tannborste

1 haarborste

2 tannkrem

0 jakke

1 bukse

2 sokker

3 undertoy

```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```

0 tannborste

1 haarborste

2 tannkrem

0 jakke

1 bukse

2 sokker

3 undertoy

0

1

2

3

kamera

lommebok

pass

mobillader

```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

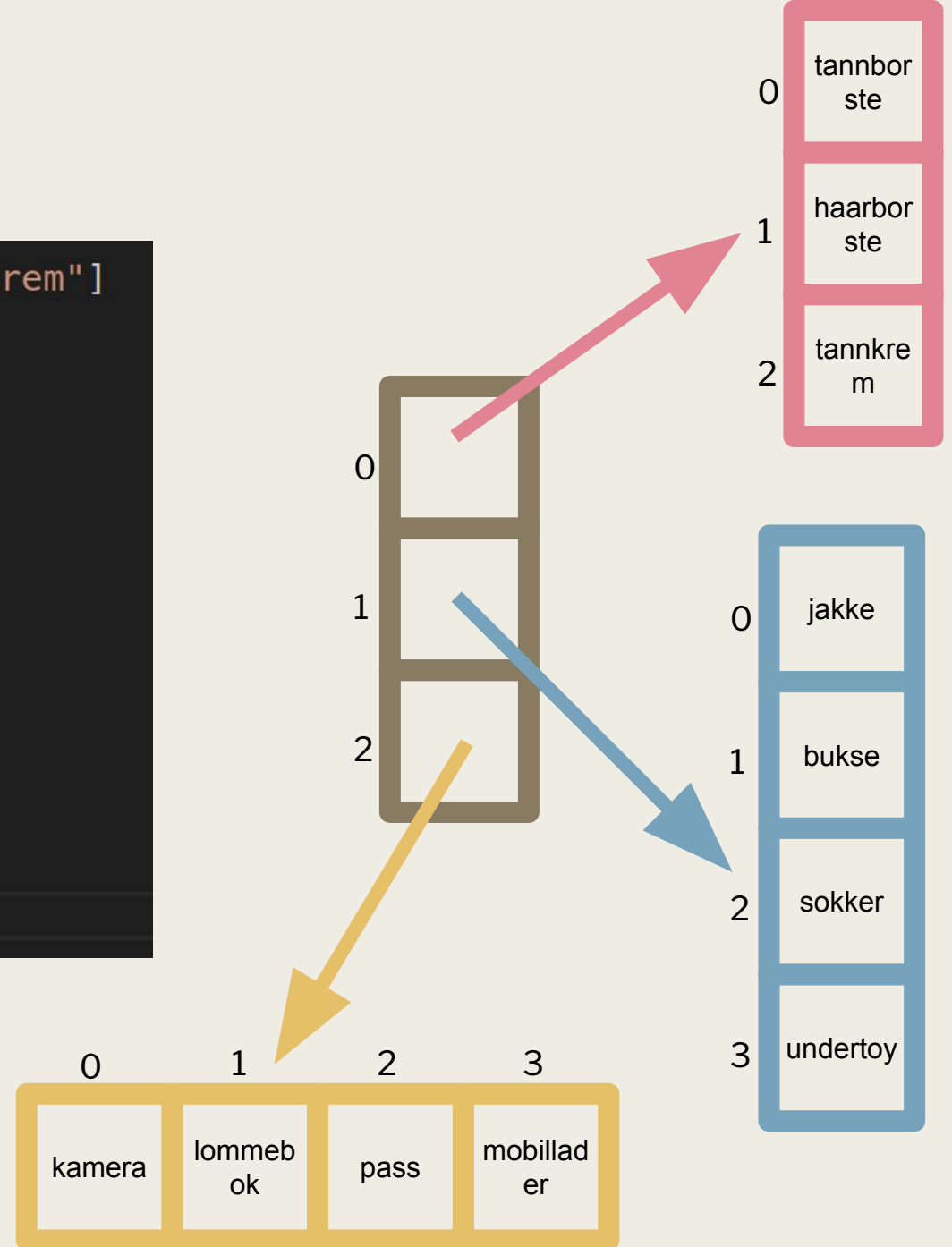
```
koffert = [toalettsaker, klaer, div]
```

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```

```
koffert.pop()
```

```
koffert[0].pop()
```



```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

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```

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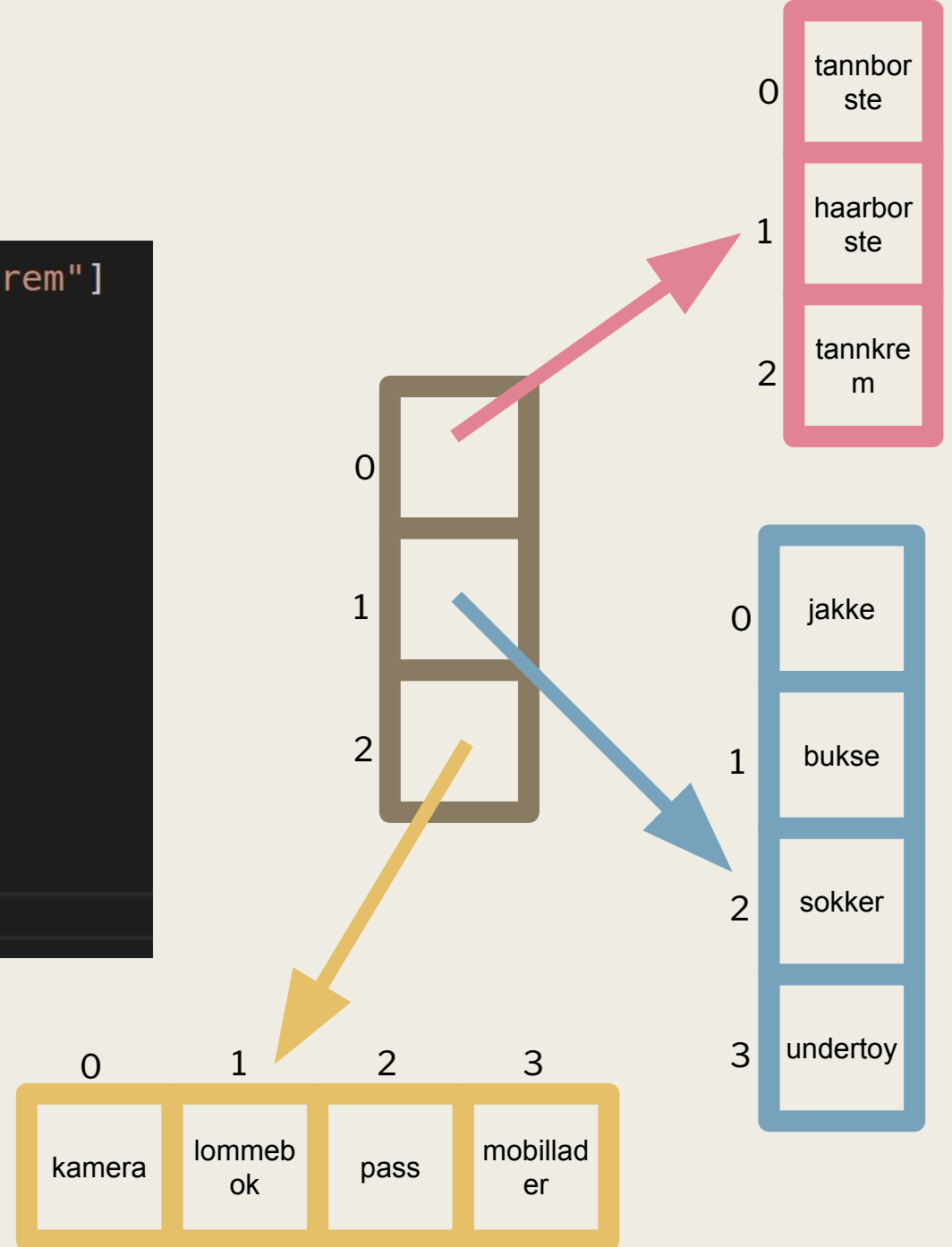
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```

```
koffert.pop()
```

```
koffert[0].pop()
```



```
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```

```
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```

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```

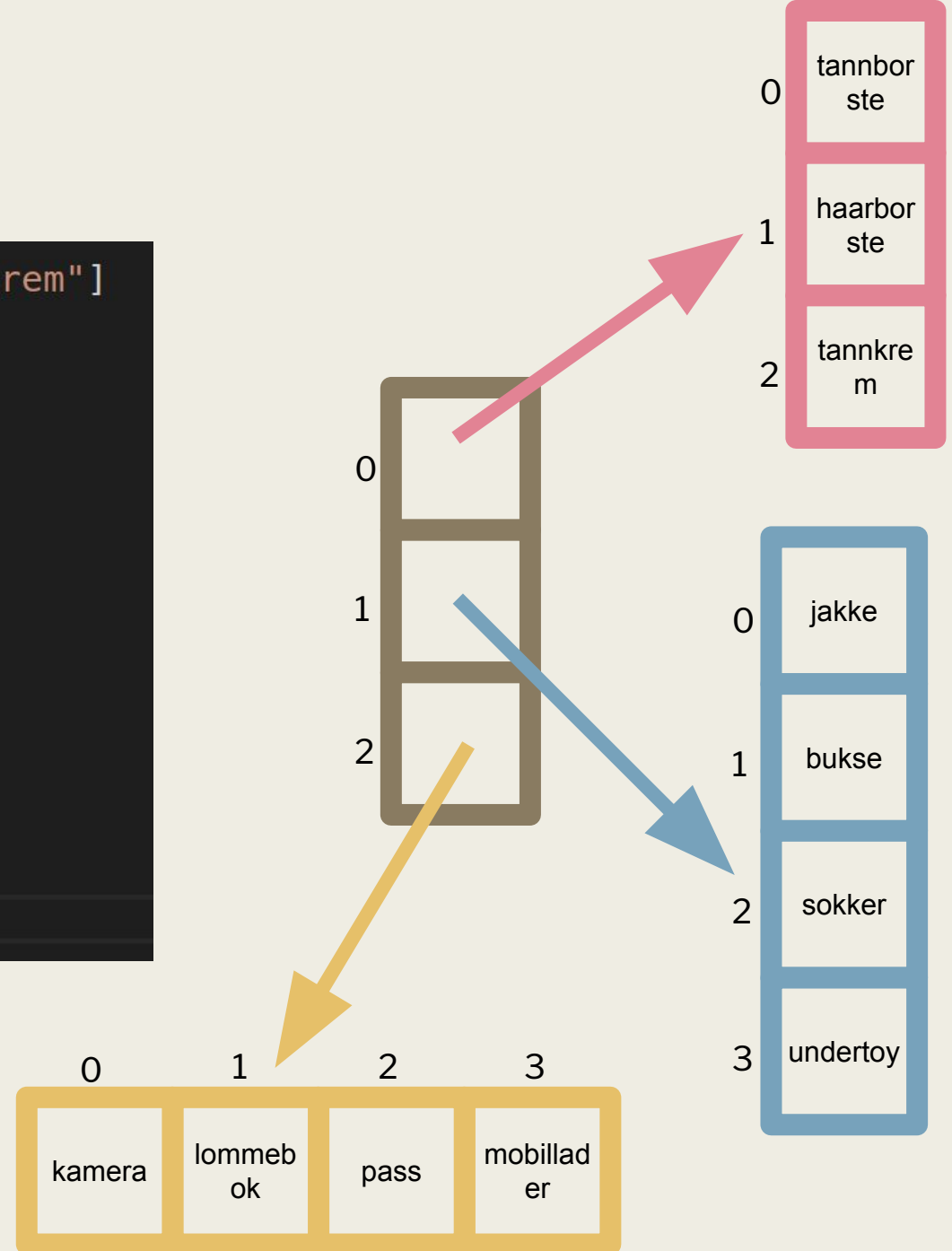
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koffert.pop()
```

```
koffert[0].pop()
```



liggeunderlag

telt

```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
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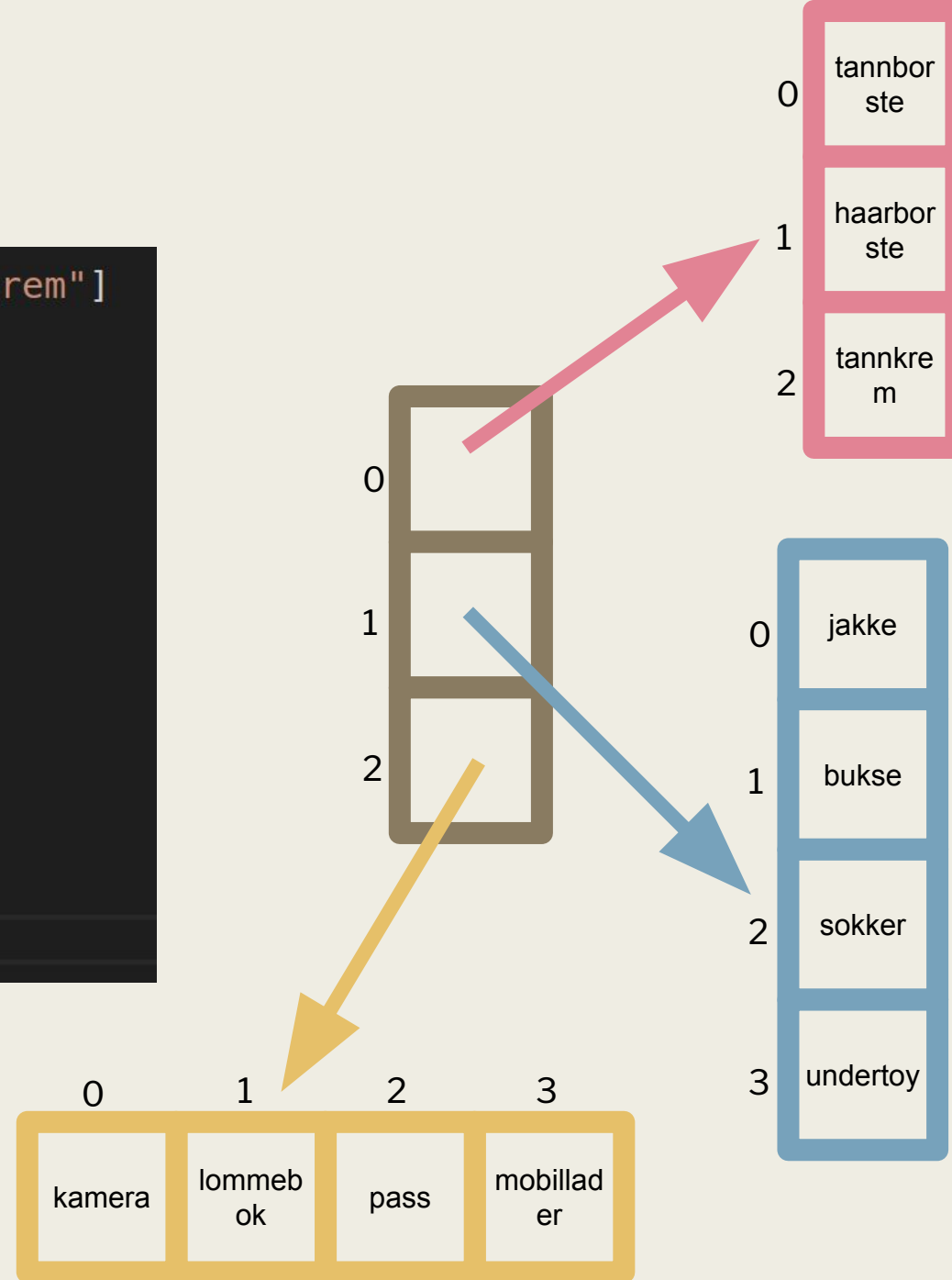
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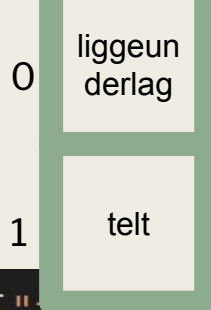
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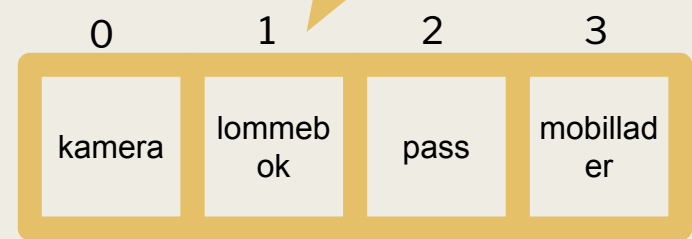
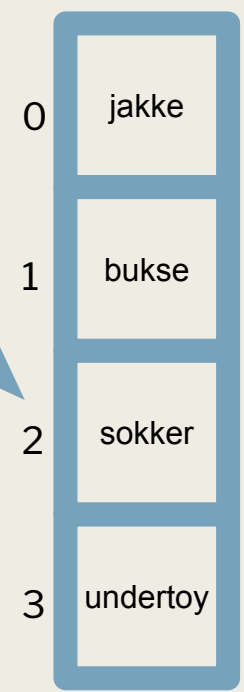
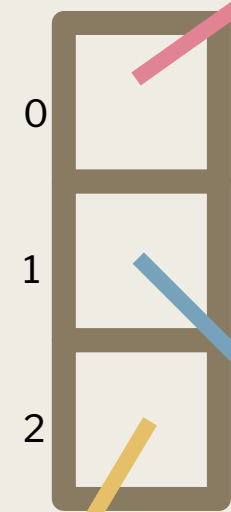
```
koffert.pop()
```

```
koffert[0].pop()
```





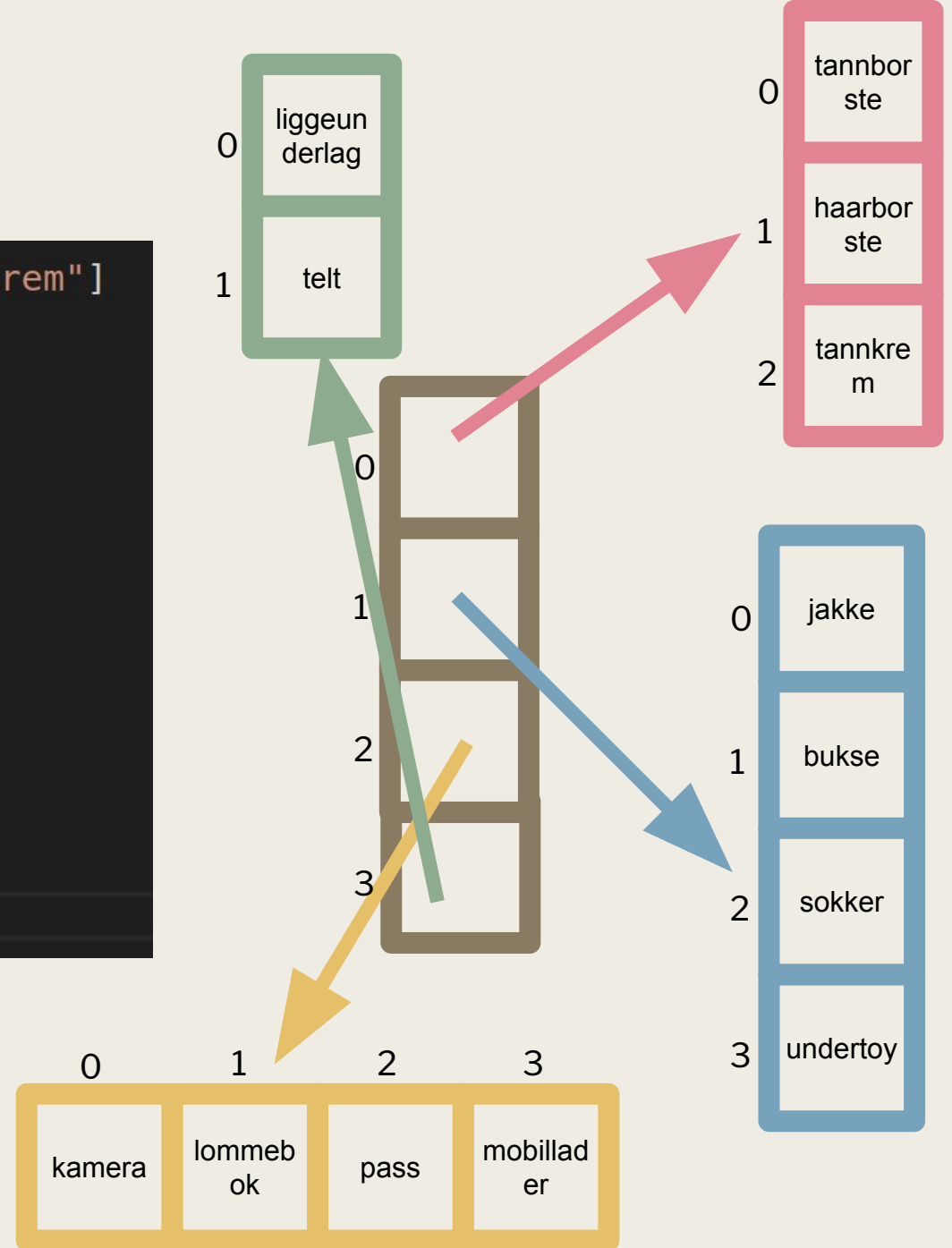
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toalettsaker = ["tannborste", "haarborste", "tannkrem"]  
klaer = ["jakke", "bukse", "sokker", "undertoy"]  
div = ["kamera", "lommebok", "pass", "mobillader"]  
koffert = [toalettsaker, klaer, div]  
  
koffert.append(["liggeunderlag", "telt"])  
koffert[1].append("genser")  
  
koffert.pop()  
koffert[0].pop()
```




```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
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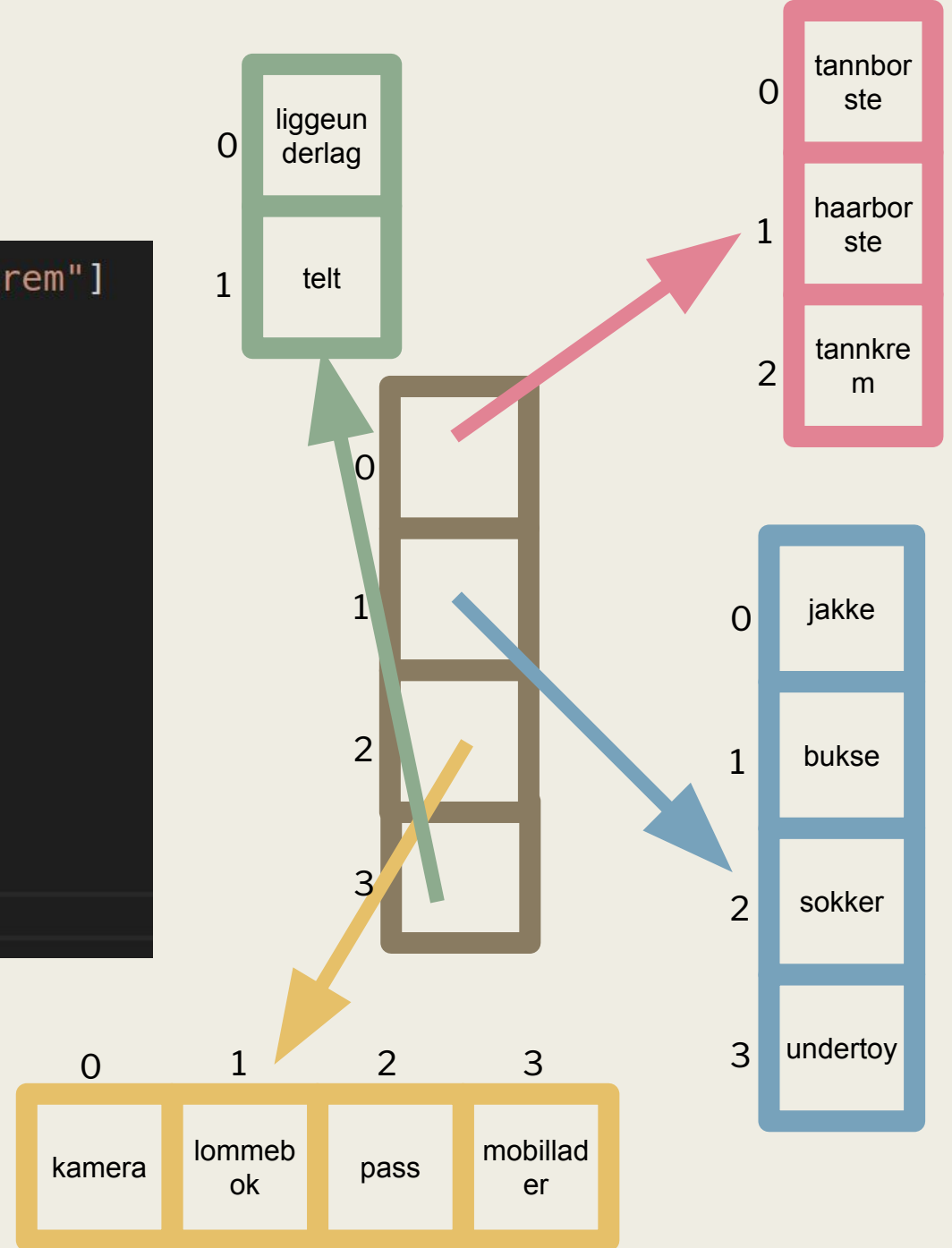
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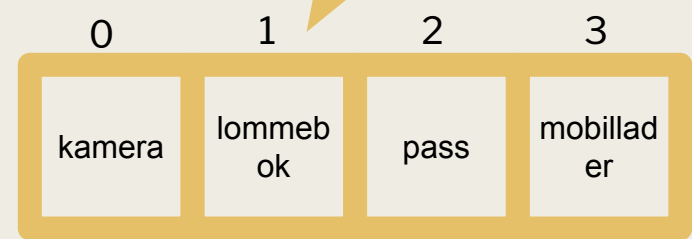
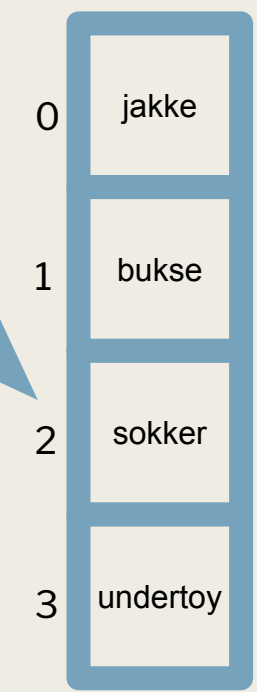
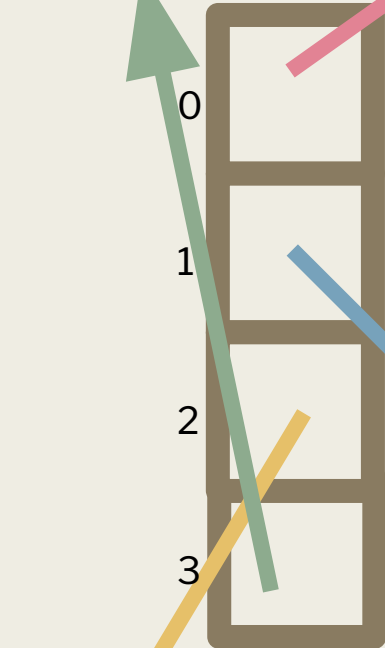
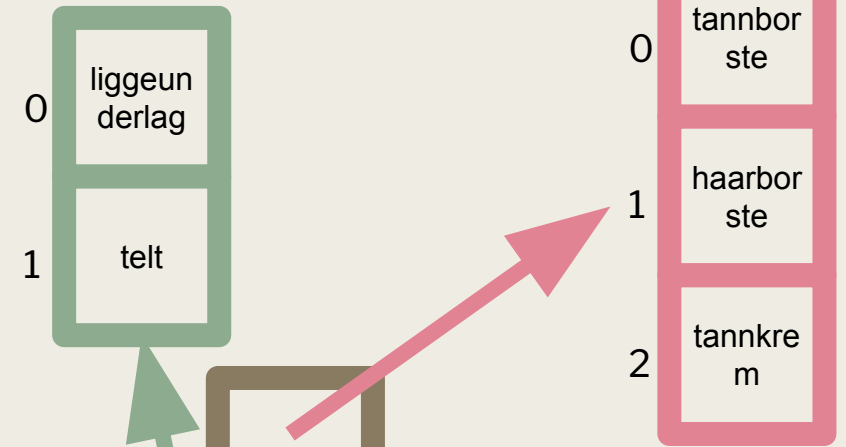
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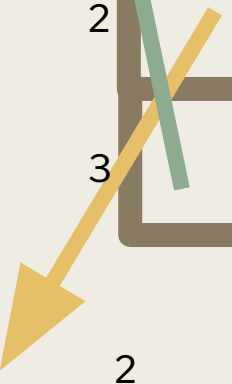
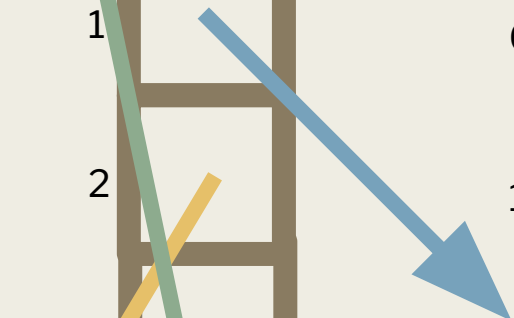
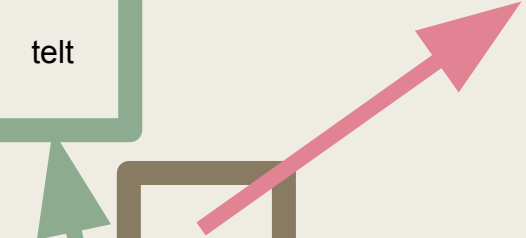
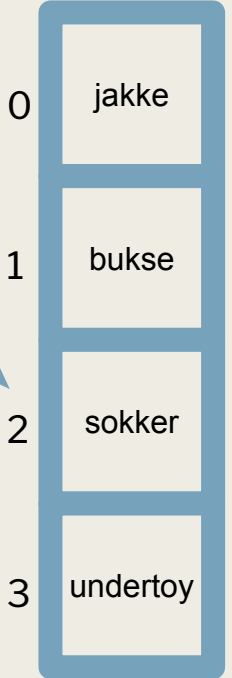
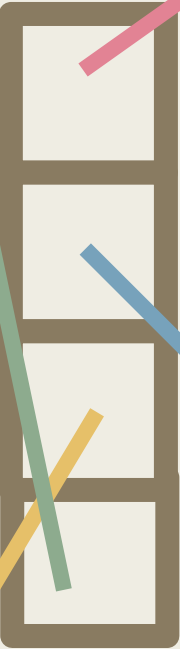
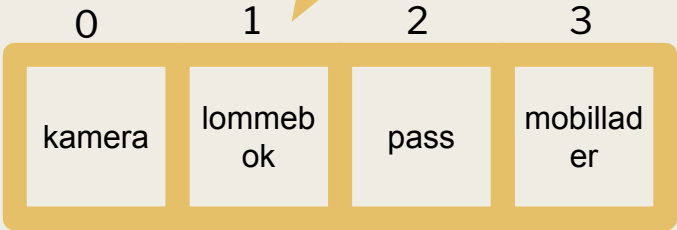


genser

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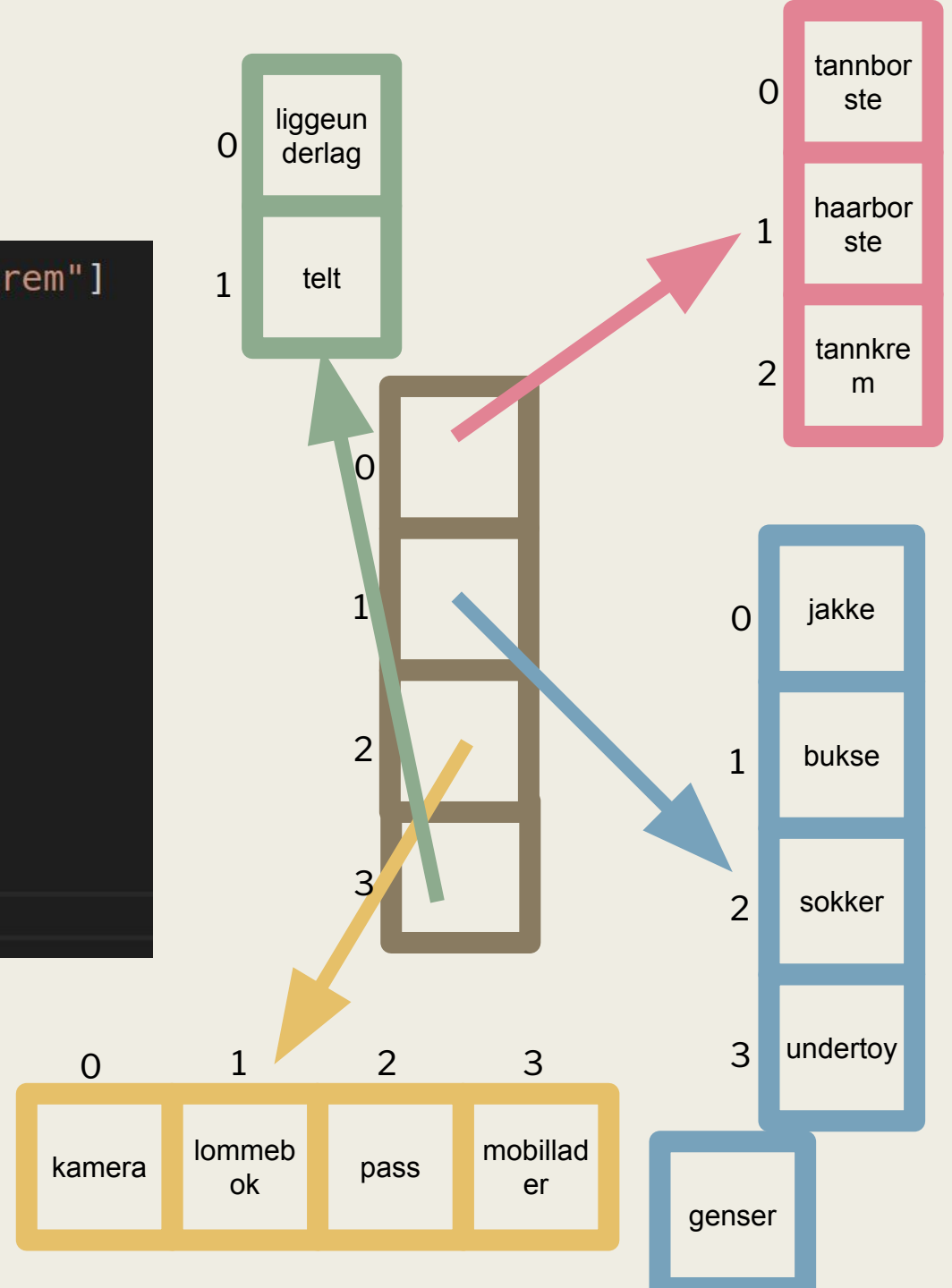
koffert.pop()
koffert[0].pop()
```



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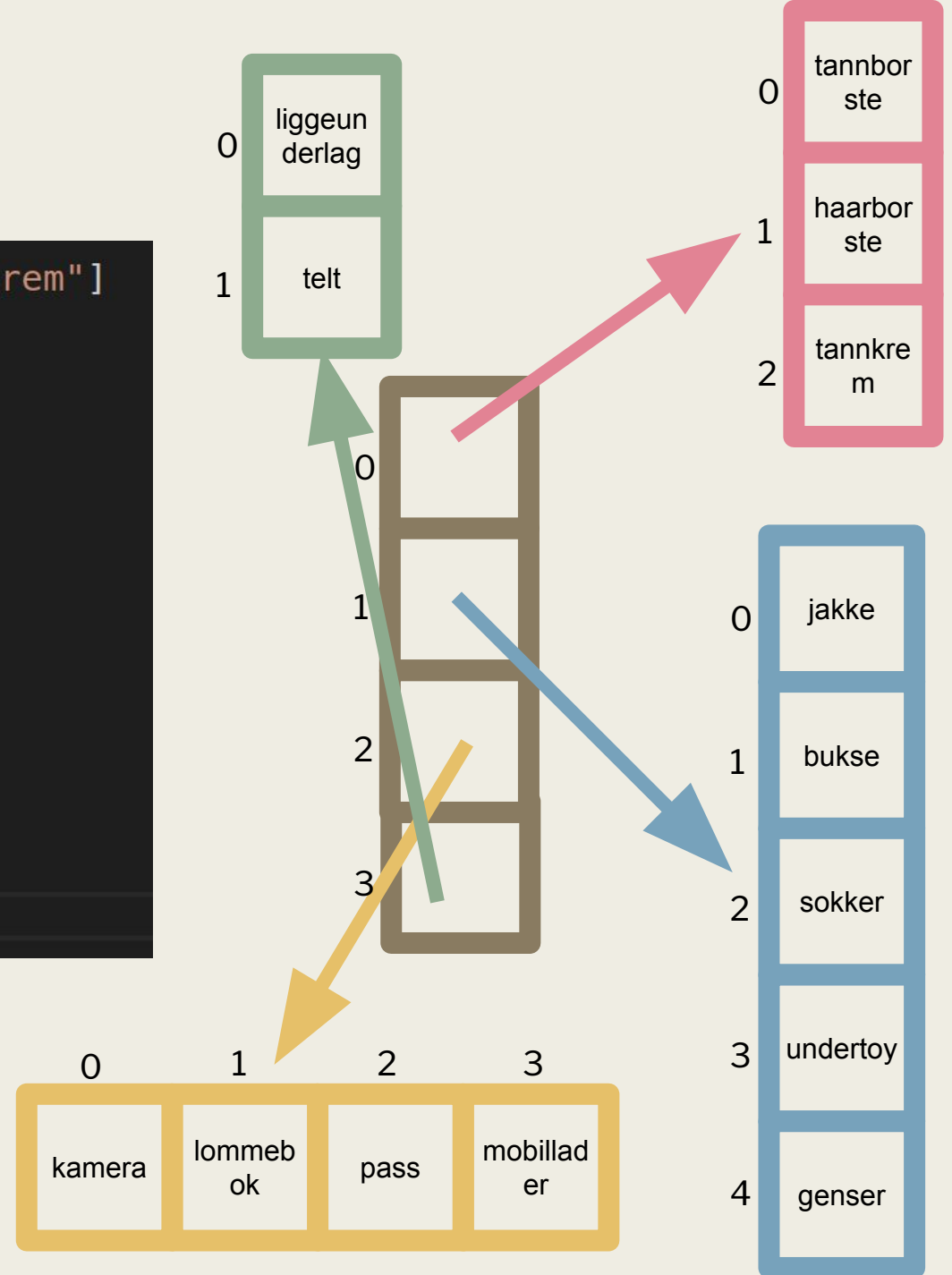
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```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
klaer = ["jakke", "bukse", "sokker", "undertoy"]
div = ["kamera", "lommebok", "pass", "mobillader"]
koffert = [toalettsaker, klaer, div]

koffert.append(["liggeunderlag", "telt"])
koffert[1].append("genser")

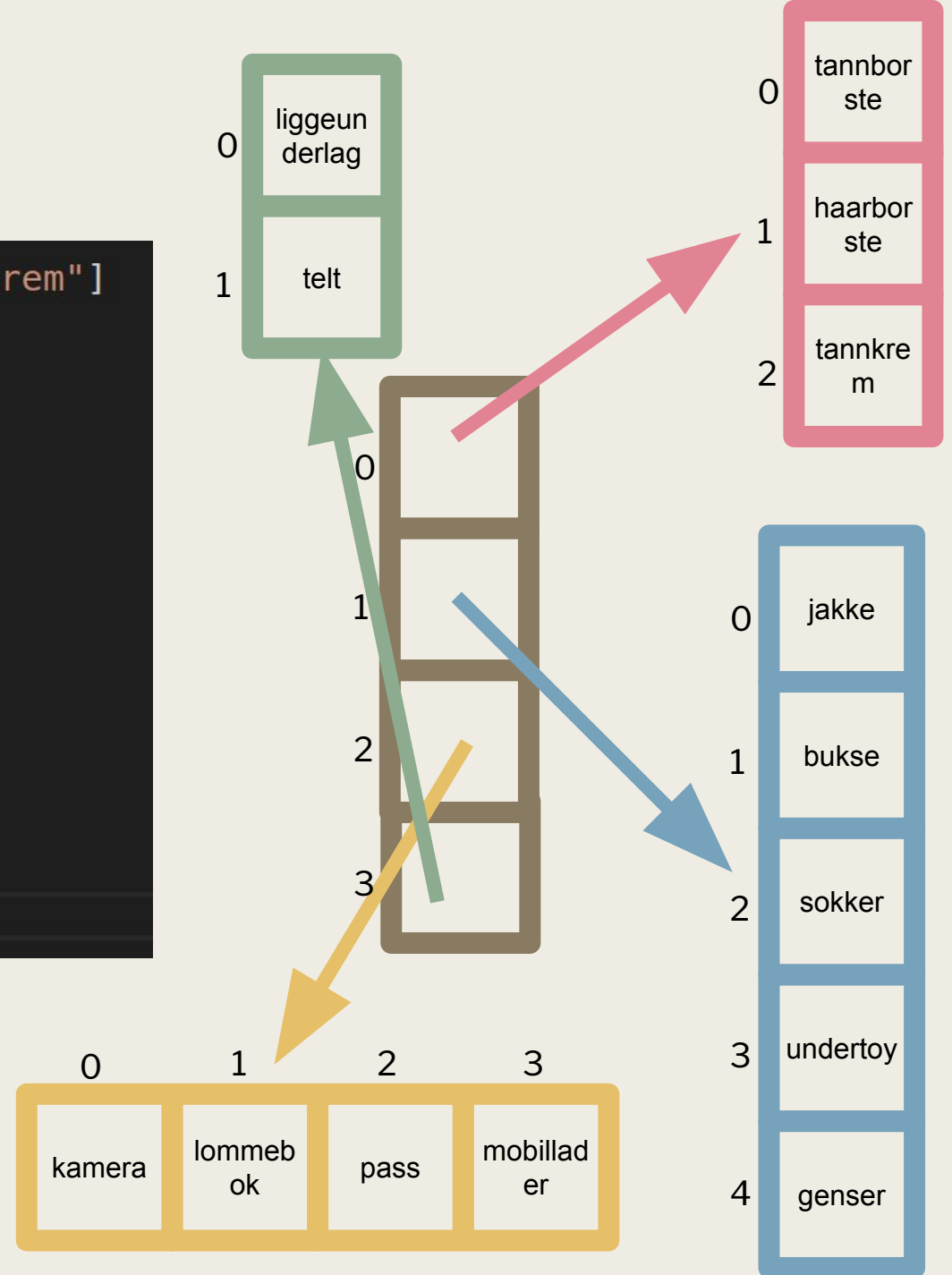
koffert.pop()
koffert[0].pop()
```

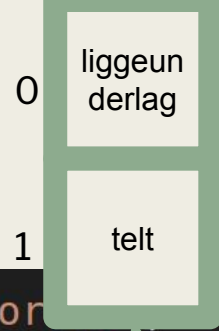


```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
klaer = ["jakke", "bukse", "sokker", "undertoy"]
div = ["kamera", "lommebok", "pass", "mobillader"]
koffert = [toalettsaker, klaer, div]

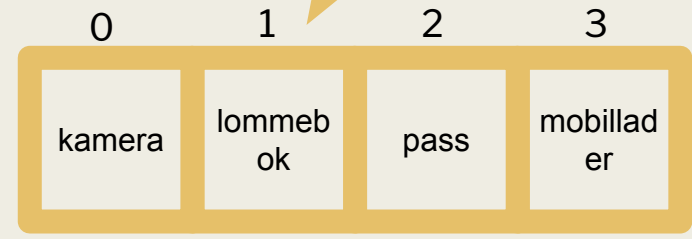
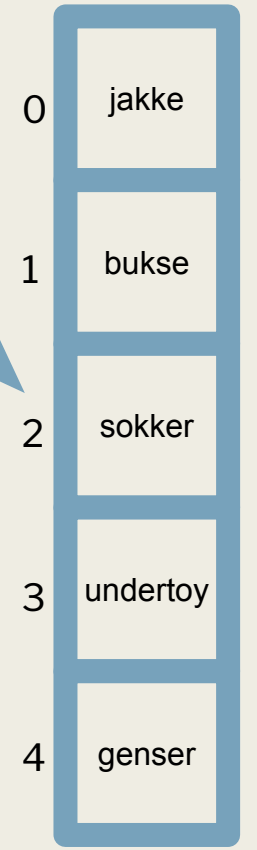
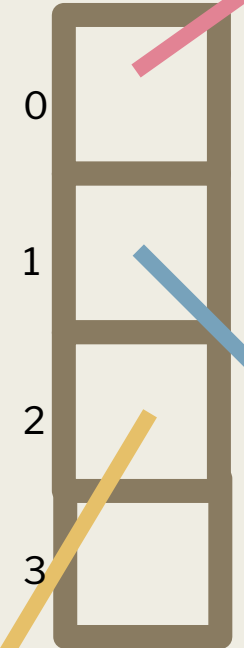
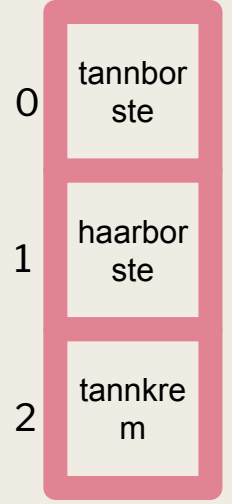
koffert.append(["liggeunderlag", "telt"])
koffert[1].append("genser")

koffert.pop()
koffert[0].pop()
```





```
toalettsaker = ["tannbørste", "haarbørste", "tannkrem"]  
klaer = ["jakke", "bukse", "sokker", "undertøy"]  
div = ["kamera", "lommebok", "pass", "mobillader"]  
koffert = [toalettsaker, klaer, div]  
  
koffert.append(["liggeunderlag", "telt"])  
koffert[1].append("genser")  
  
koffert.pop()  
koffert[0].pop()
```




```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

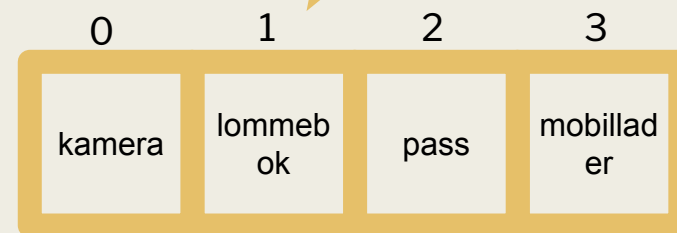
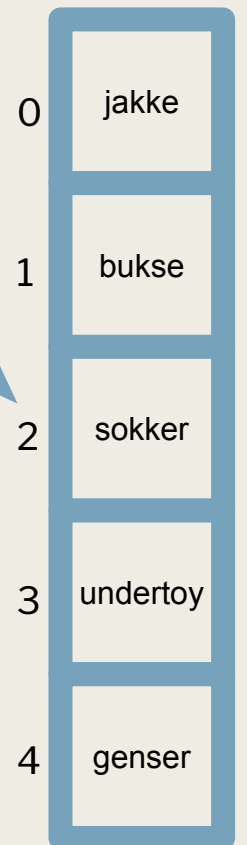
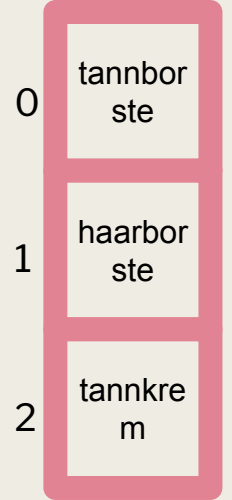
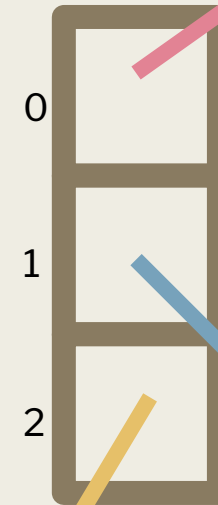
```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```



```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

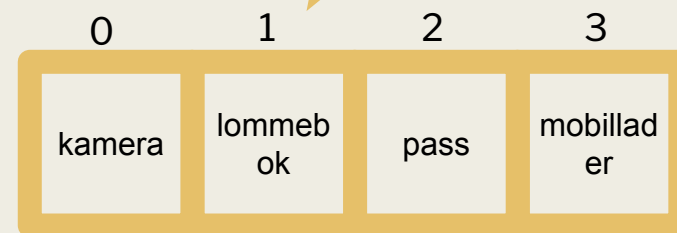
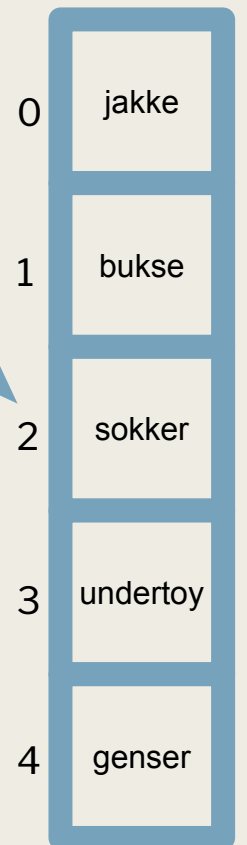
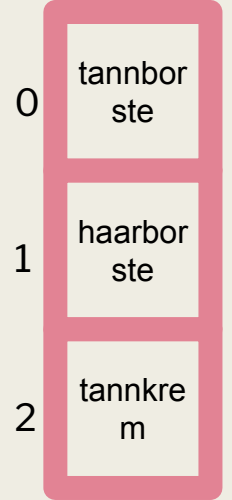
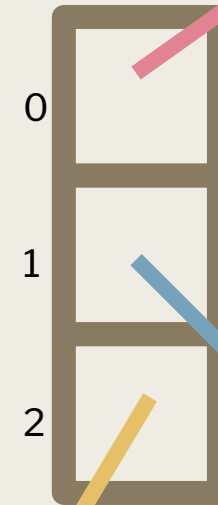
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koffert = [toalettsaker, klaer, div]
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koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```



```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
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```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

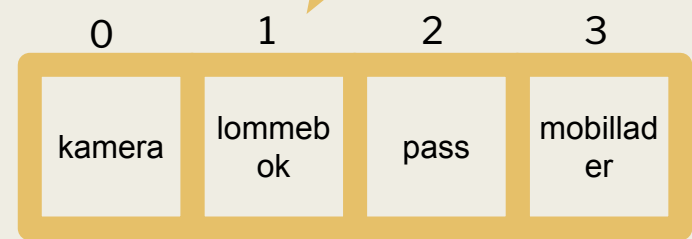
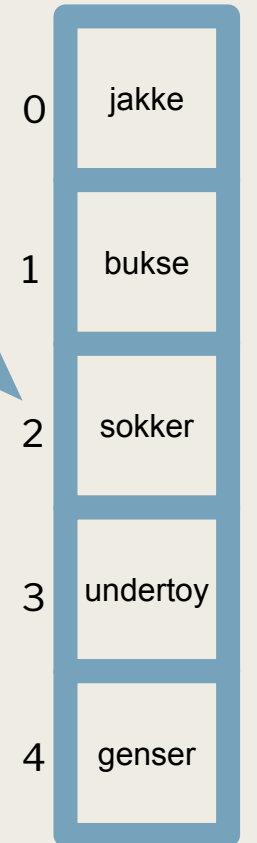
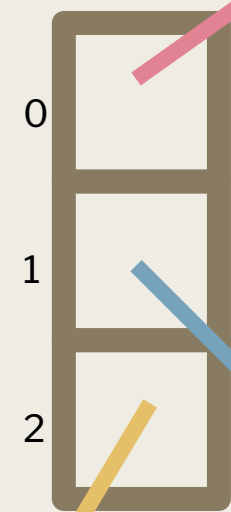
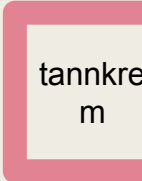
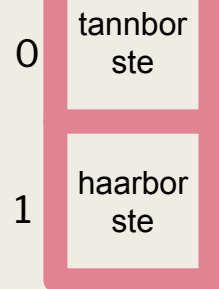
```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```



```
toalettsaker = ["tannborste", "haarborste", "tannkrem"]
```

```
klaer = ["jakke", "bukse", "sokker", "undertoy"]
```

```
div = ["kamera", "lommebok", "pass", "mobillader"]
```

```
koffert = [toalettsaker, klaer, div]
```

```
koffert.append(["liggeunderlag", "telt"])
```

```
koffert[1].append("genser")
```

```
koffert.pop()
```

```
koffert[0].pop()
```

0 tannborste

1 haarborste

0

1

2

0 jakke

1 bukse

2 sokker

3 undertoy

4 genser

0

1

2

3

kamera

lommebok

pass

mobillader

Mengder

- mengde = {element, element2, element3,.....}
- Mengder har ingen rekkefølge på elementene sine
- Ingen gjentakelser

- PS: tomme mengder lages slik:
 - *mengde = set()* ikke *mengde = {}*

Nyttige operasjoner på mengder

- `mengde.add(element)`
 - *Legger til et nytt element i mengden*
- `mengde.discard(element)`
 - *fjerner element fra mengden, gjør ingenting dersom elementet ikke finnes i mengden.*
- `mengde.remove(element)`
 - *fjerner element fra mengden, får ett unntak dersom elementet ikke finnes i mengden*
- `mengde.clear()`
 - *fjerner alle elementer i mengden, gjør mengden tom.*
- `len(<mengde>)`
 - *Finner antall elementer i mengden*
- `set(<liste>)`
 - *Kovertere en liste til en mengde*



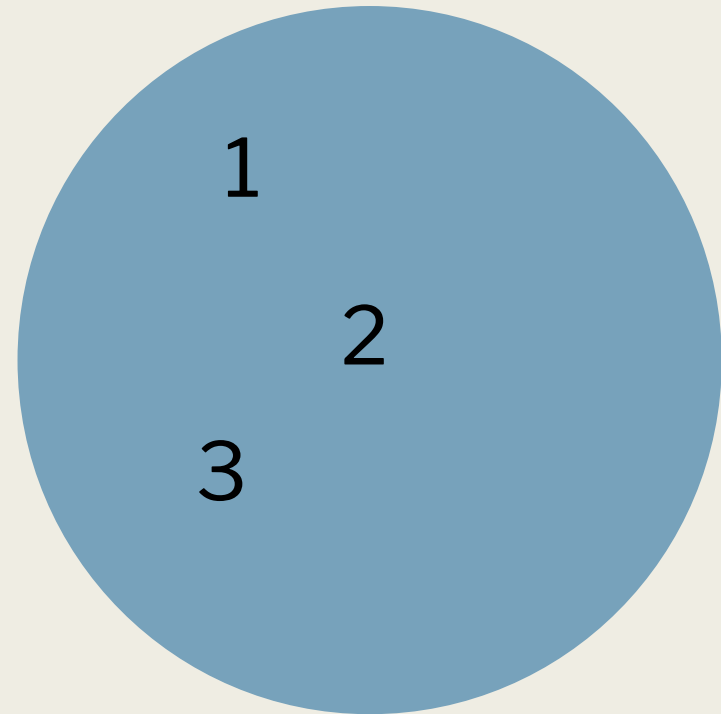
```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



```
mengde = {1,2,3}
```

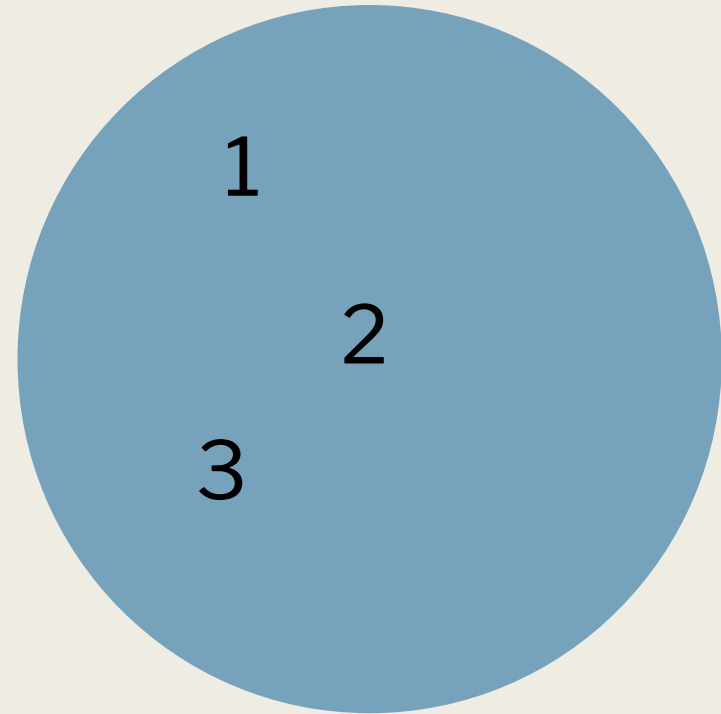
```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```

4



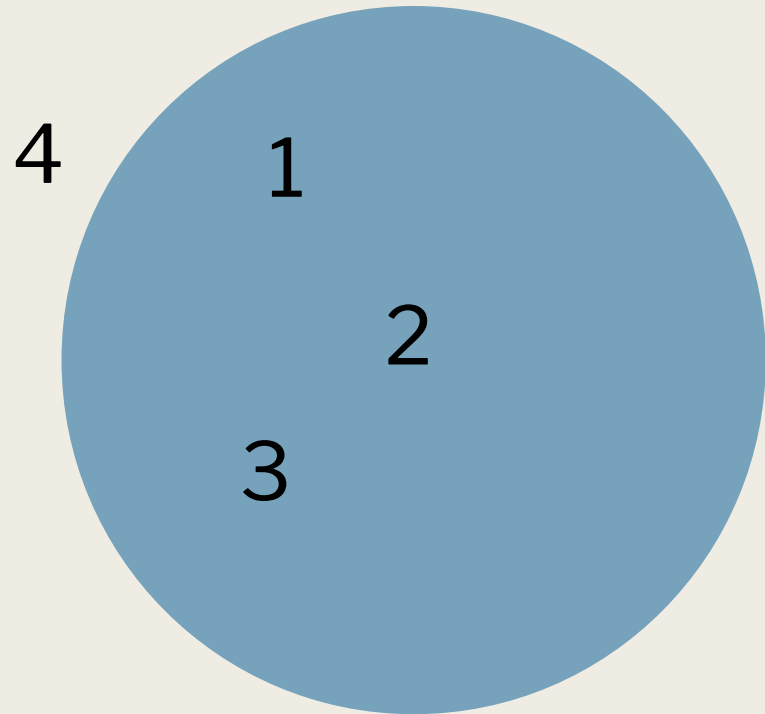

```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



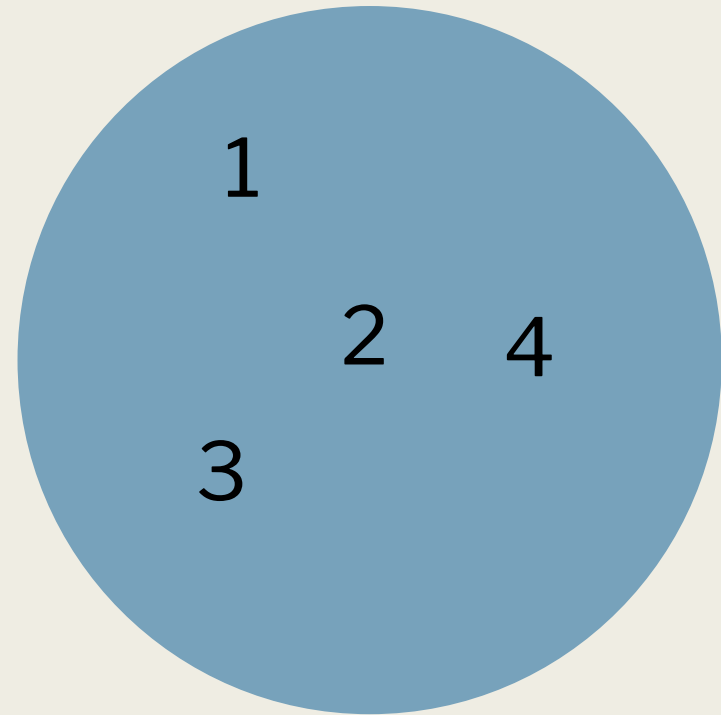
```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



```
mengde = {1,2,3}
```

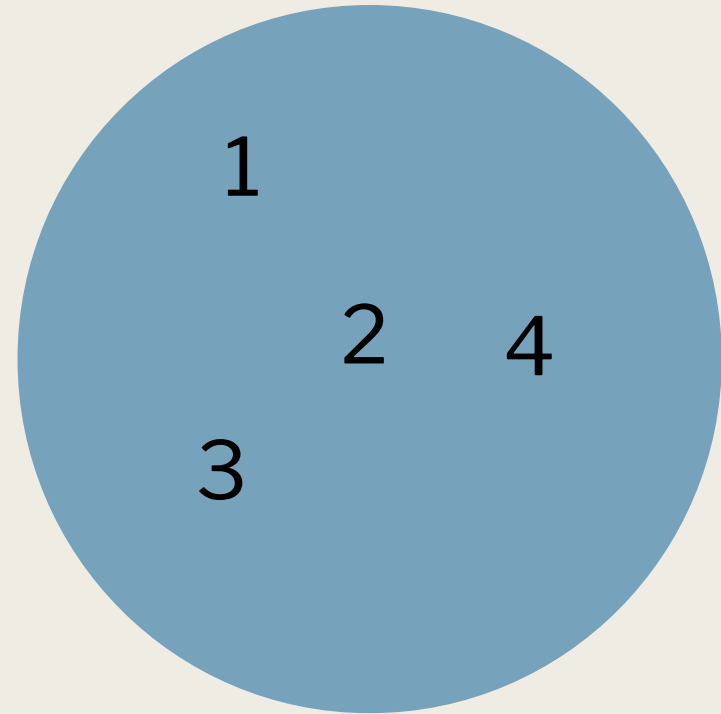
```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```

3



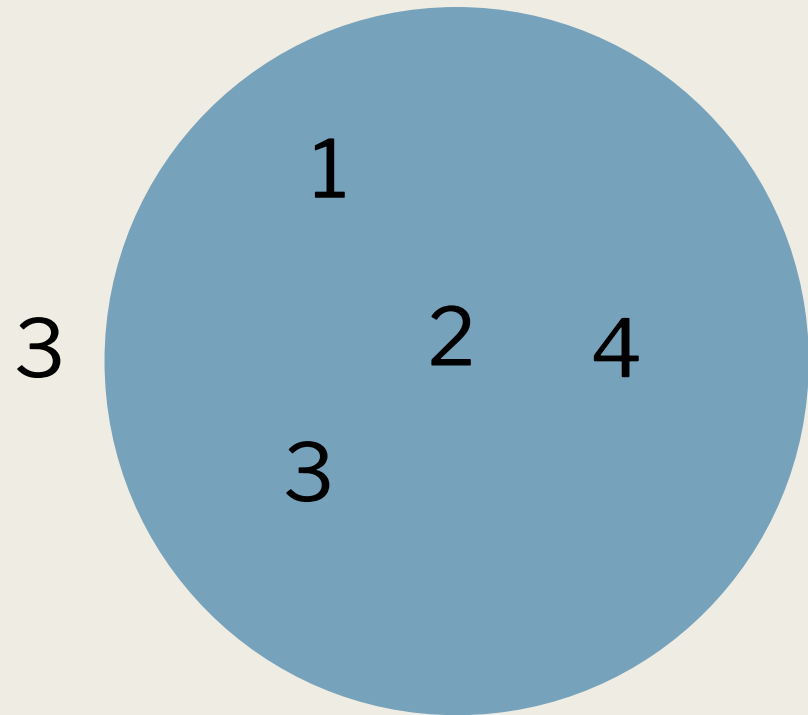
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mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



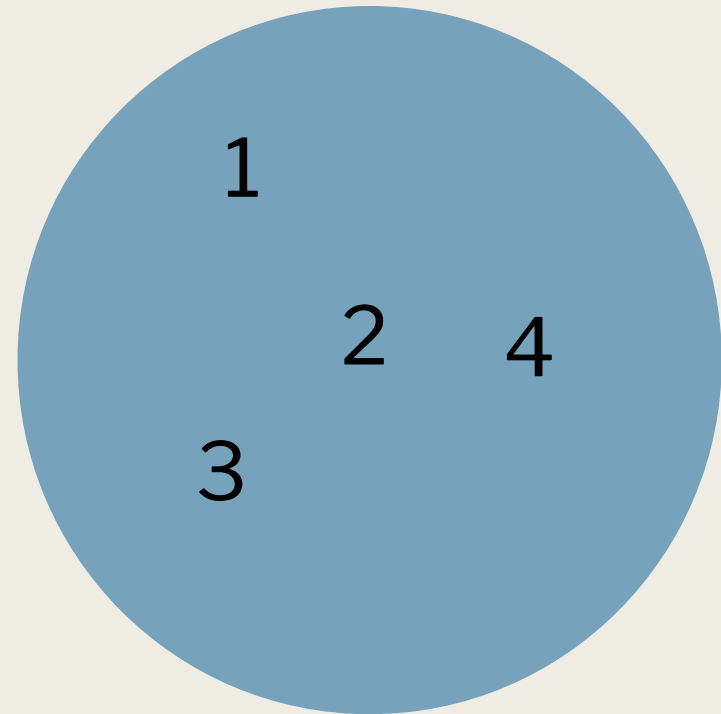
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mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



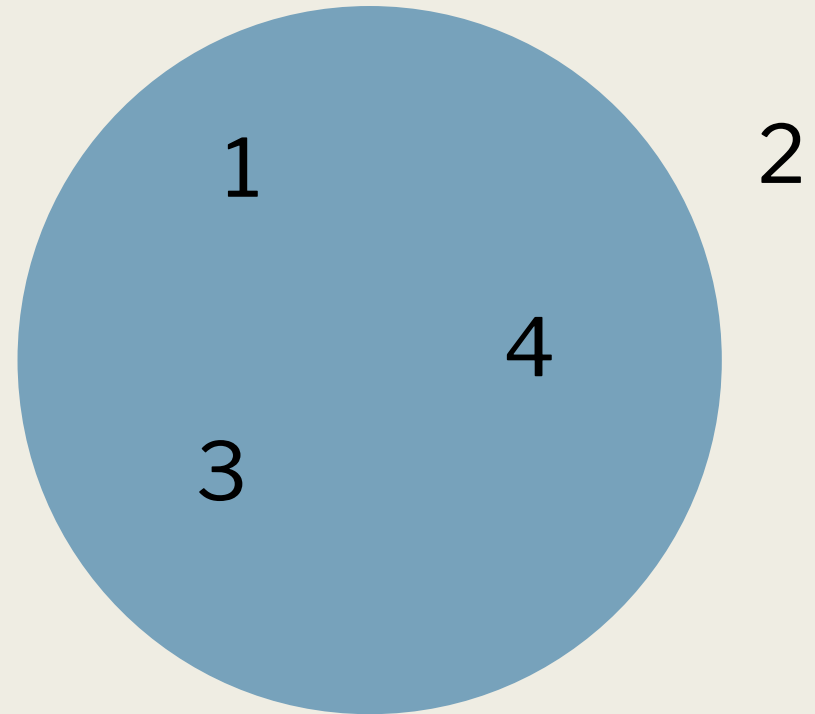
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```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



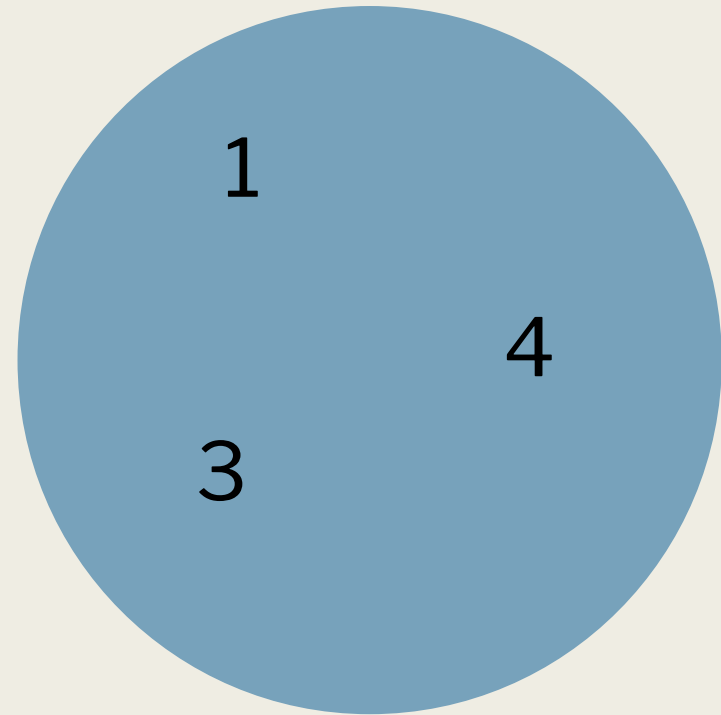
```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



2

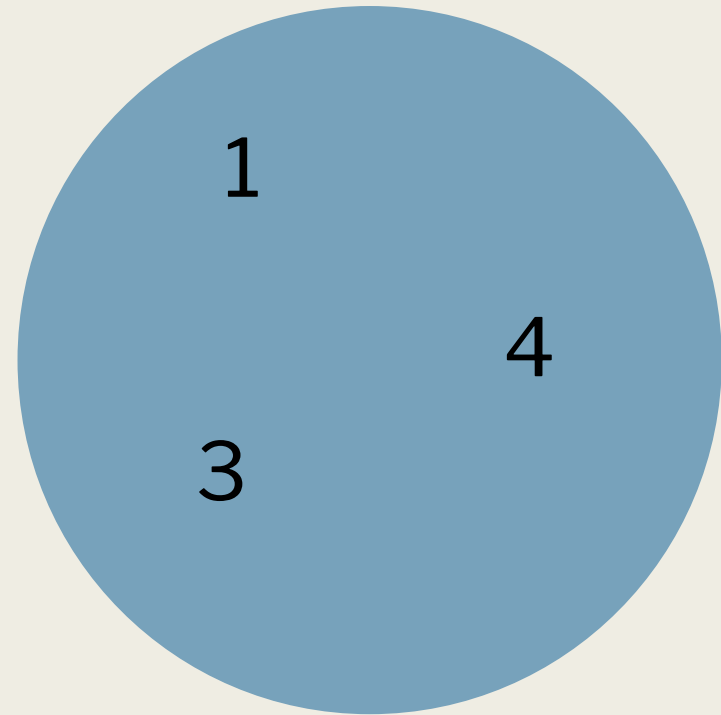
```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



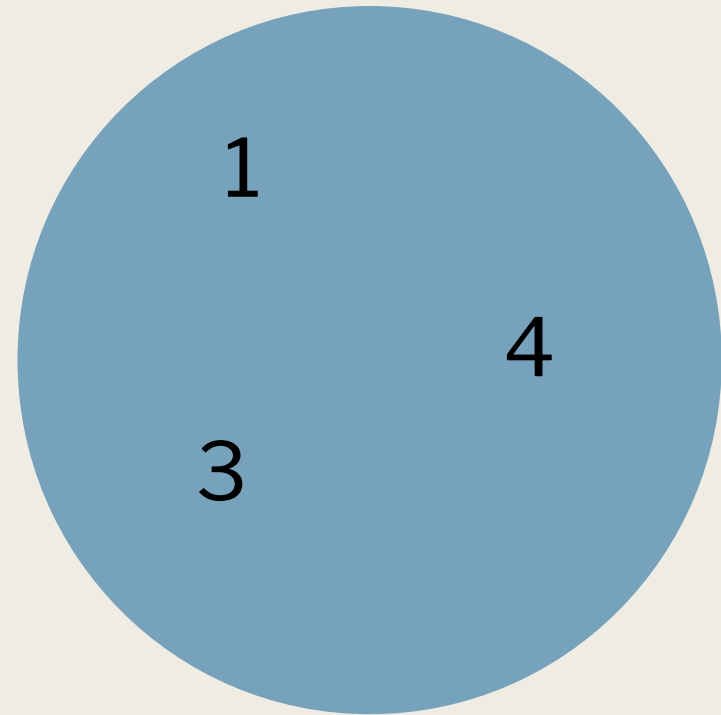

```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



1

4

3

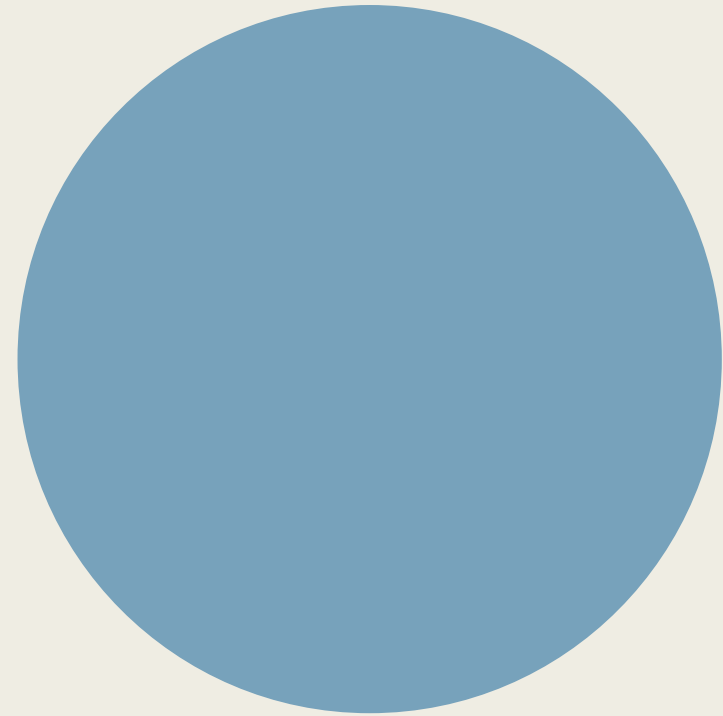
```
mengde = {1,2,3}
```

```
mengde.add(4)
```

```
mengde.add(3)
```

```
mengde.discard(2)
```

```
mengde.clear()
```



Mapping (ordbøker)

- Er en beholder som holder på par av nøkler og verdi
 - *Hver nøkkel i ordboken er knyttet til en verdi.*
- Syntaks:
 - *ordbok = {nøkkel: verdi, nøkkel2:verdi2}*
- Bruk:
 - *I stedet for å bruke indeksering som i lister bruker man nøkkelen for å hente ut verdier*

Nyttige operasjoner på ordbøker:

- `ordbok[nøkkel] = verdi`
 - *legge til nytt element i ordboken ELLER endre på eksisterende.*
- Eks. `kontakter["Per"] = 45667990`
 - *dersom "Per" allerede finnes i ordboken vil verdien til per endres.*
- `Ordbok.pop(nøkkel)`
 - *Fjerner nøkkelen og verdien*



```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```

```
ordbok.pop("vi")
```

nøkkel

vi

jeg

verdi

we

me

```
ordbok = {"vi": "we", "jeg": "me"}
```



```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```

```
ordbok.pop("vi")
```

nøkkel

vi

jeg

verdi

we

me

du

you

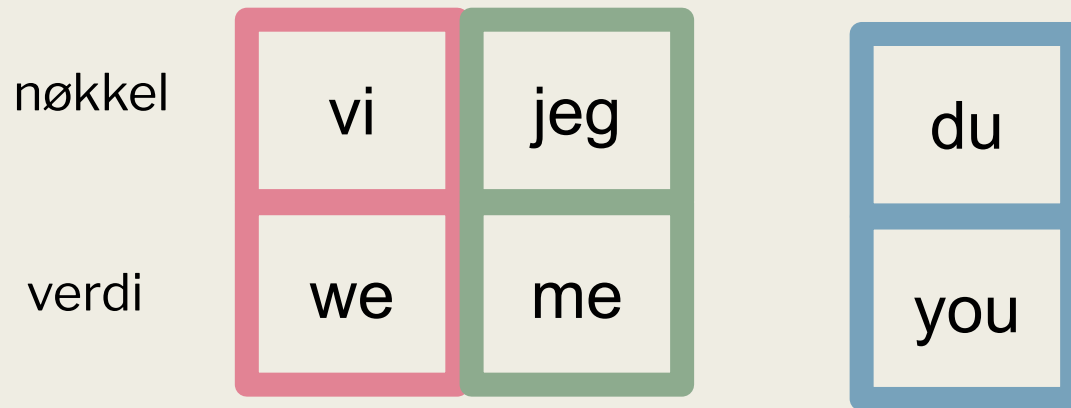
```
ordbok = {"vi": "we", "jeg": "me"}
```



```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```

```
ordbok.pop("vi")
```




```
ordbok = {"vi": "we", "jeg": "me"}
```



```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "mee"
```

```
ordbok.pop("vi")
```

nøkkel	vi	jeg	du
verdi	we	me	you

```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```



```
ordbok["jeg"] = "meee"
```

```
ordbok.pop("vi")
```

nøkkel	vi	jeg	du
verdi	we	meee	you

```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```

→ `ordbok.pop("vi")`

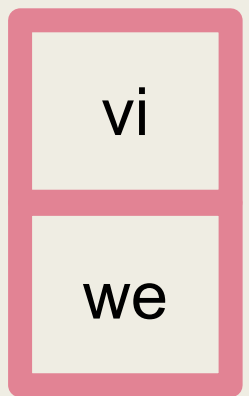
nøkkel	vi	jeg	du
verdi	we	meee	you

```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```

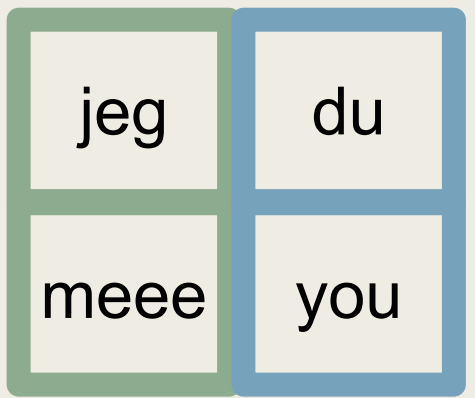
```
ordbok["jeg"] = "meee"
```

→ `ordbok.pop("vi")`



nøkkel

verdi



```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```

→ `ordbok.pop("vi")`

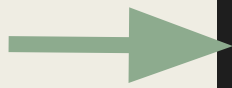
vi
e

nøkkel	jeg	du
verdi	meee	you

```
ordbok = {"vi": "we", "jeg": "me"}
```

```
ordbok["du"] = "you"
```

```
ordbok["jeg"] = "meee"
```



```
ordbok.pop("vi")
```

nøkkel	jeg	du
verdi	meee	you

Oppgave 5

Gitt følgende ordbok ->

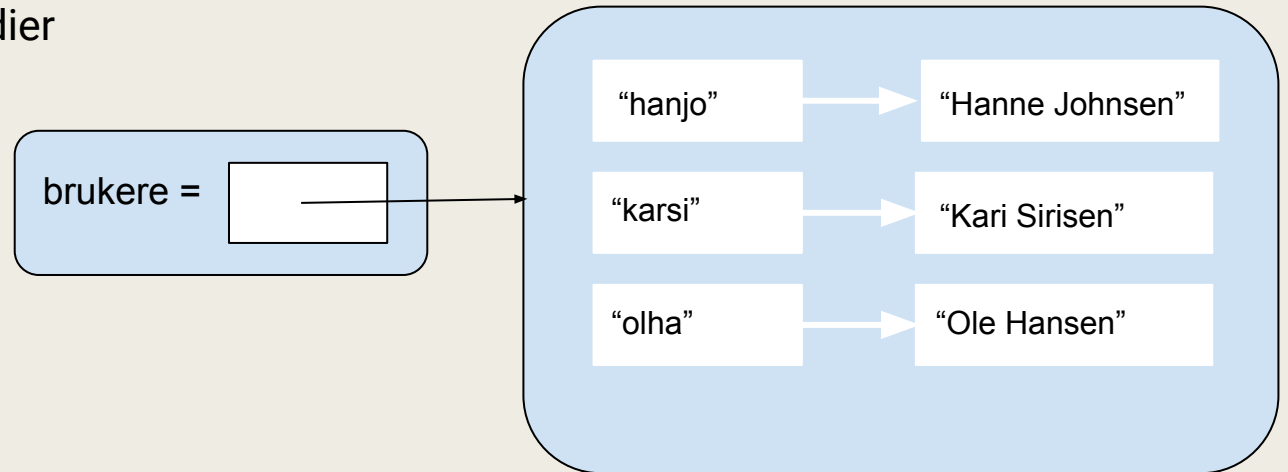
5.1 Definer en ordbok/dictionary som heter brukere, hvor du legger inn følgende par av nøkler og verdier (brukernavn som nøkler og navn som verdi).

5.2 karsi har registrert seg med feil navn, mellomnavnet hennes mangler, endre navnet hennes til "Kari Marie Sirisen".

5.3 Register deg selv som bruker med et brukernavn og navn.

5.4 Skriv ut hanjo sitt navn.

5.4 Fjern Hanne Johansen fra ordboken.



Oppgave 6:

Her er et eksempel på en uleselig/uryddig kode, hva slags endringer ville du gjort med dem ?

```
def f1() :  
    i = float(input("input"))  
    print(i*i)  
  
def f2() :  
    i = input()  
    print("velkommen til in1000 ", i)  
  
def f3( ) :  
    print ( "Hei!" )  
  
f3()  
f2()  
f1()
```


Neste uke:

- While-løkker
- For-løkker med teller
- For-løkker på lister