LØKKER

INF100

HØST 2025

Torstein Strømme

Joker

I denne oppgaven skal vi skrive en kunstig intelligens for å spille Joker fra Norsk Tipping. I dette spillet får man på forhånd vite fem grunntall; for hvert av grunntallene må man velge om man skal gå «opp» eller «ned» før et hemmelig vippetall avsløres. Dersom man valgte «opp» og det avslørte vippetallet er høyere eller lik grunntallet, vinner man en større premie. Det samme skjer dersom man velger «ned» og vippetallet er lavere eller lik grunntallet. Vi antar at de hemmelige vippetallene er tilfeldig valgt mellom 0 og 9.

Strategien vi skal implementere er å si «opp» dersom grunntallet er 4 eller lavere, og si «ned» ellers.

I filen *joker.py*, skriv et program som leser inn 5 tall fra en fil joker.json som inneholder en liste med 5 heltall, på formen:

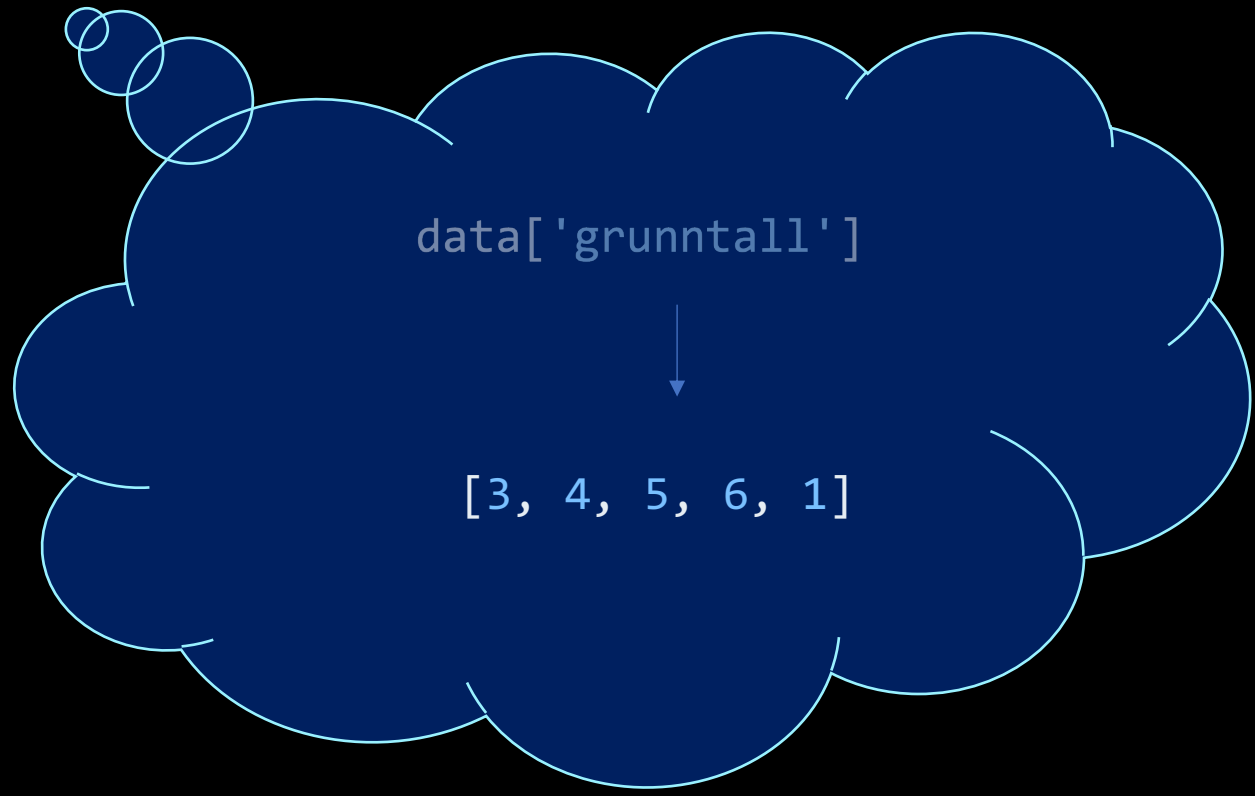
```
{
  "grunntall": [ 3, 4, 5, 6, 1 ]
}
```

Disse representerer grunntallene vi får oppgitt når vi begynner å spille Joker. Deretter skal programmet skrive ut enten «opp» eller «ned», for hvert av de fem grunntallene. En kjøring av programmet kan se slik ut for filen over:

```
opp
opp
ned
ned
opp
```

```
for num in data['grunntall']:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```

```
for num in data['grunntall']:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```

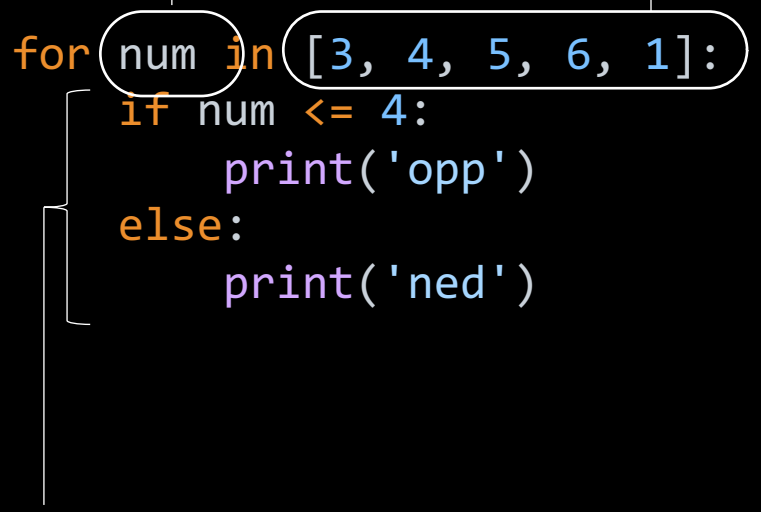


```
for num in data['grunntall']:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```

```
for num in [3, 4, 5, 6, 1]:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```

iterand. variabel som viser til et nytt element i den iterable for hver iterasjon av løkken

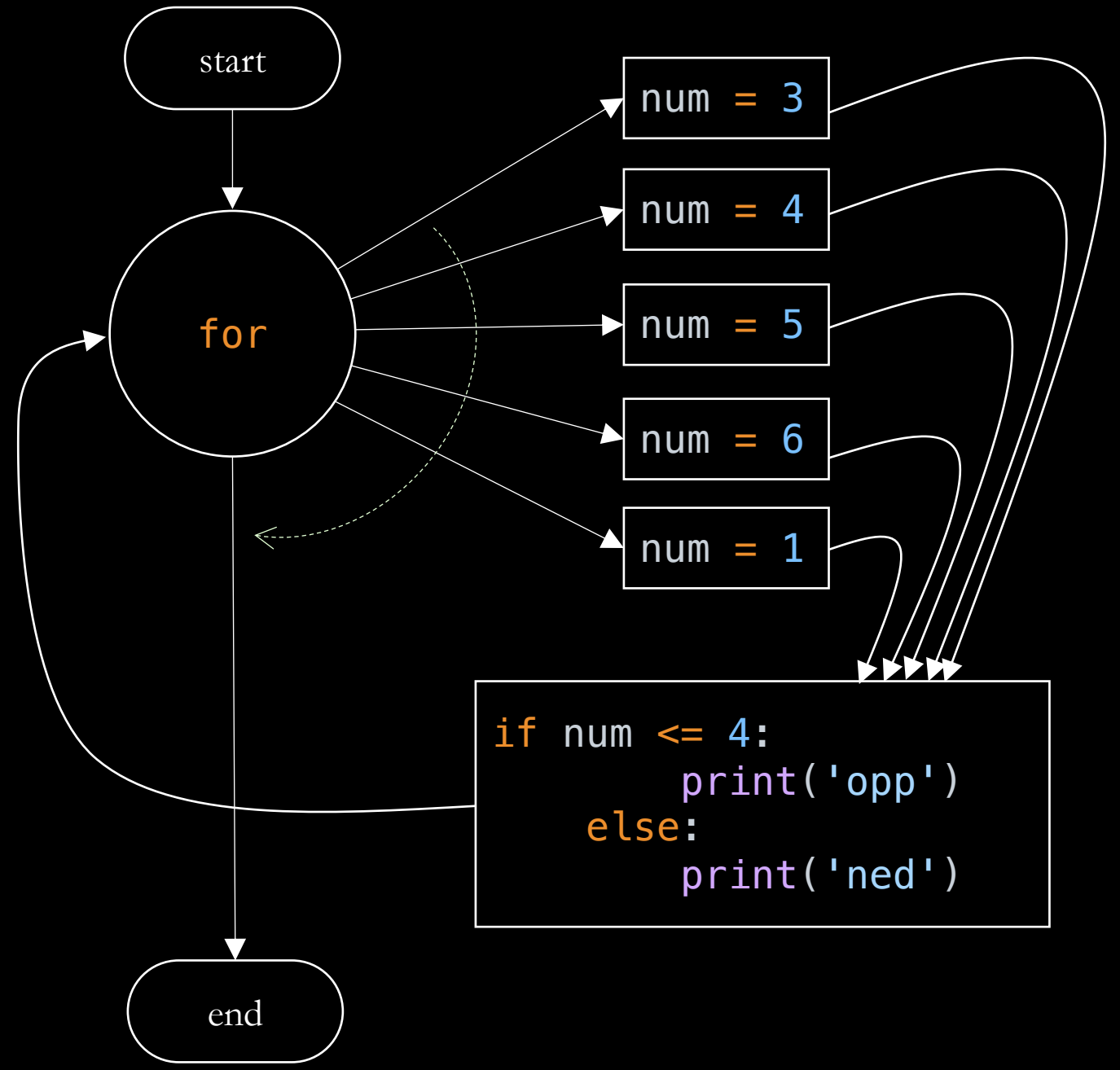
iterabel. en samling av elementer (f. eks. en liste) som skal itererers over



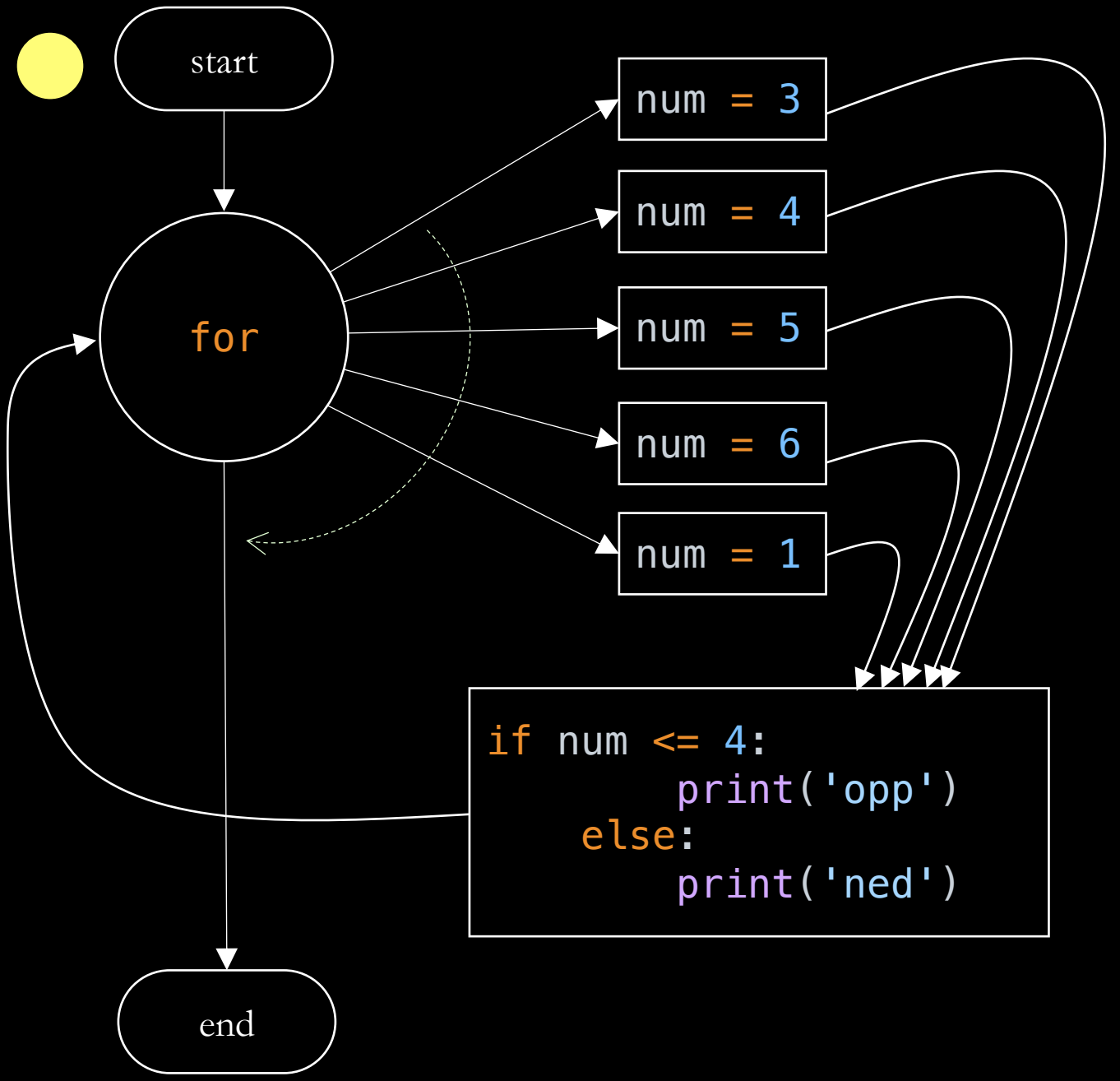
for-løkke. en setning med en løkkekropp som utføres én gang for hvert element i en iterabel.

løkkekropp. innrykket blokk av setninger som utføres én gang for hvert element i iterabelen.

```
for num in [3, 4, 5, 6, 1]:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```



```
for num in [3, 4, 5, 6, 1]:
    if num <= 4:
        print('opp')
    else:
        print('ned')
```



HVA PRINTER DETTE PROGRAMMET?

```
print('start')
for x in [0, 1, 2, 3]:
    print('loop', end=' ')
    print(x)
print('end')
```

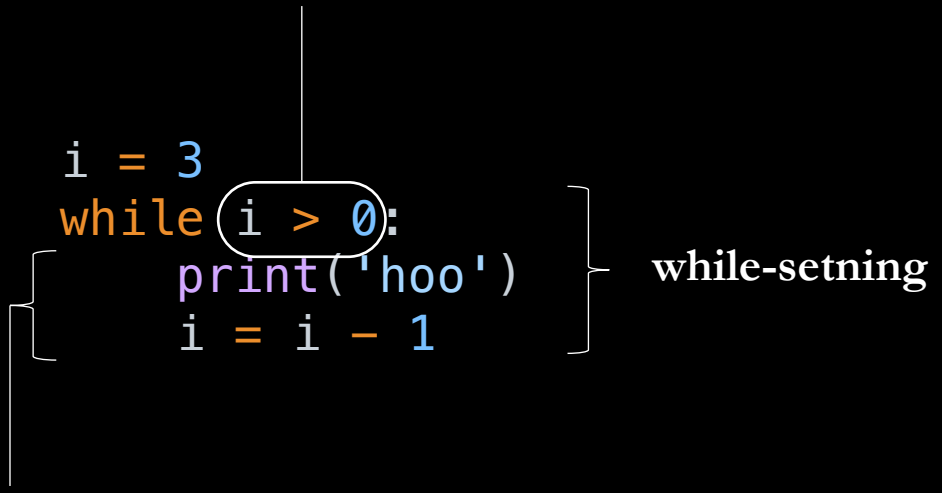
HVA PRINTER DETTE PROGRAMMET?

```
x = 99
print(x)
for x in [3, 3, 2]:
    print('loop', end=' ')
    print(x)
print('huzzah')
print(x)
```

hoo
hoo
hoo

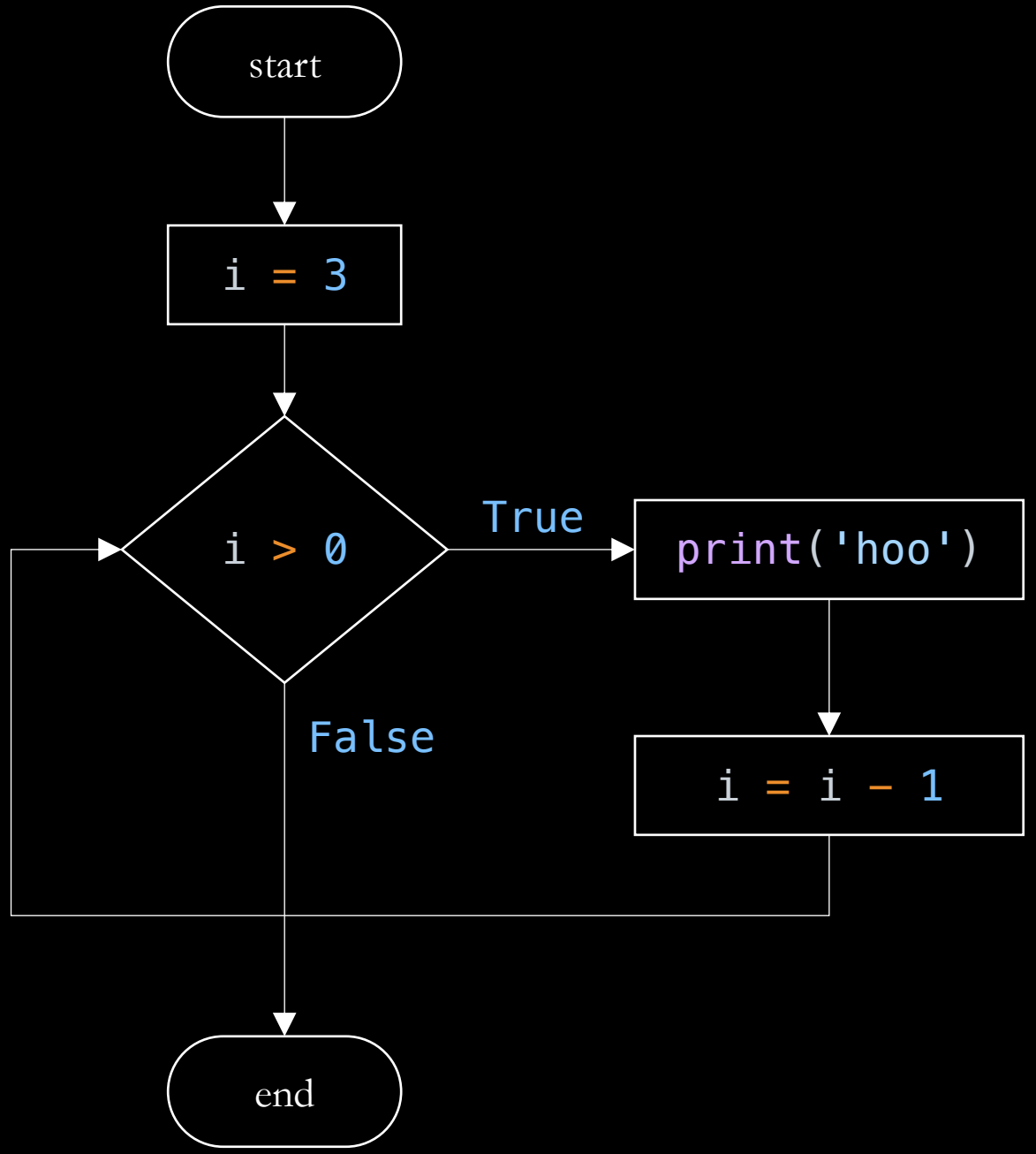
```
print('hoo')
print('hoo')
print('hoo')
```

betingelse. et uttrykk som evaluerer til en boolsk verdi (True eller False)



løkkekropp. innrykket blokk av setninger som utføres så lenge betingelsen er True.

```
i = 3
while i > 0:
    print('hoo')
    i = i - 1
```



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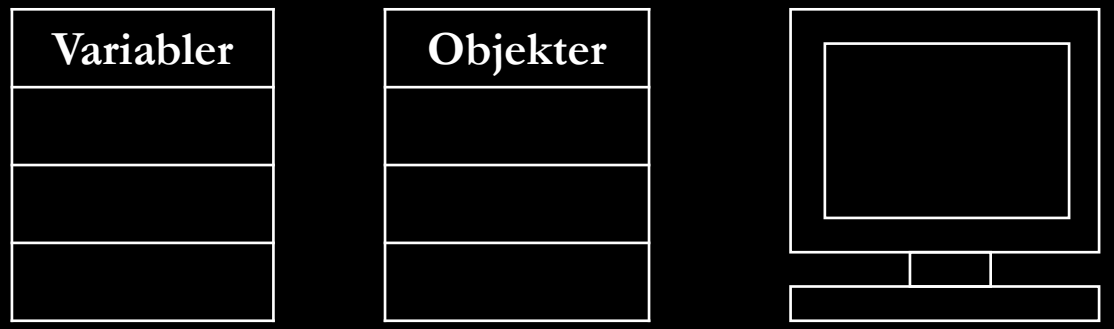

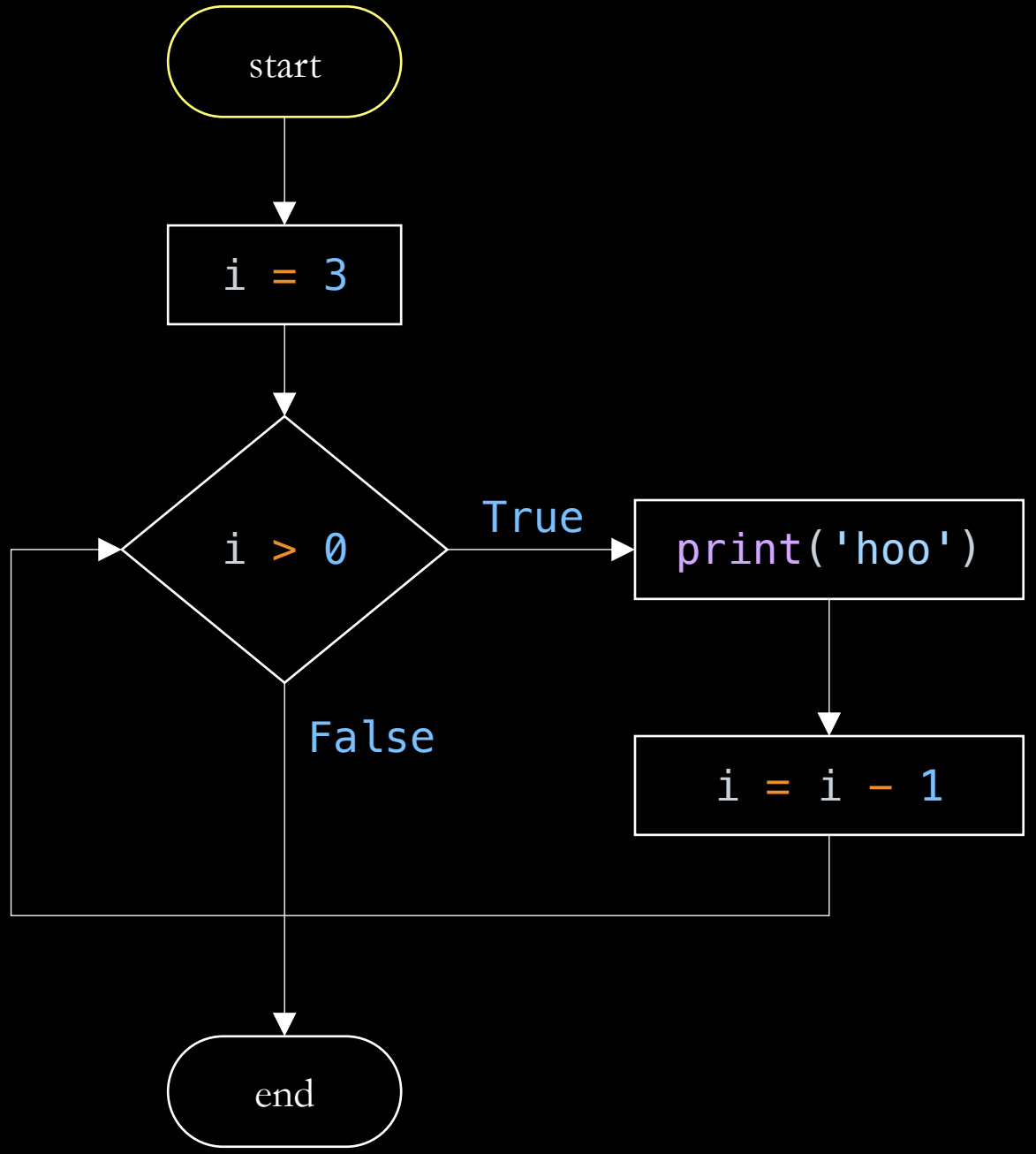

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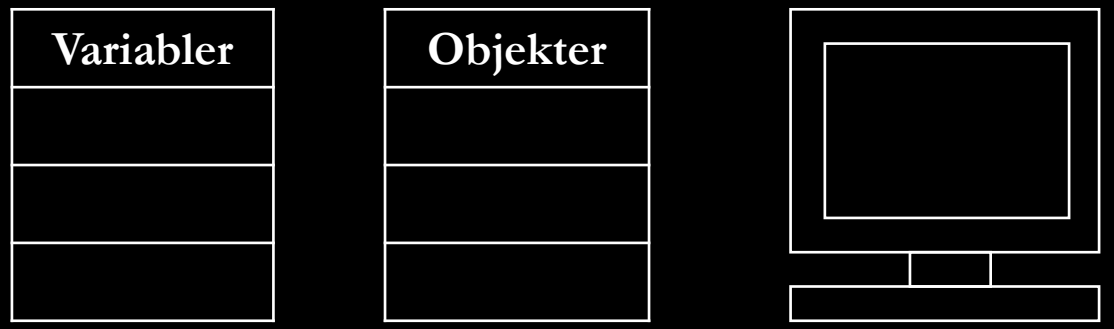

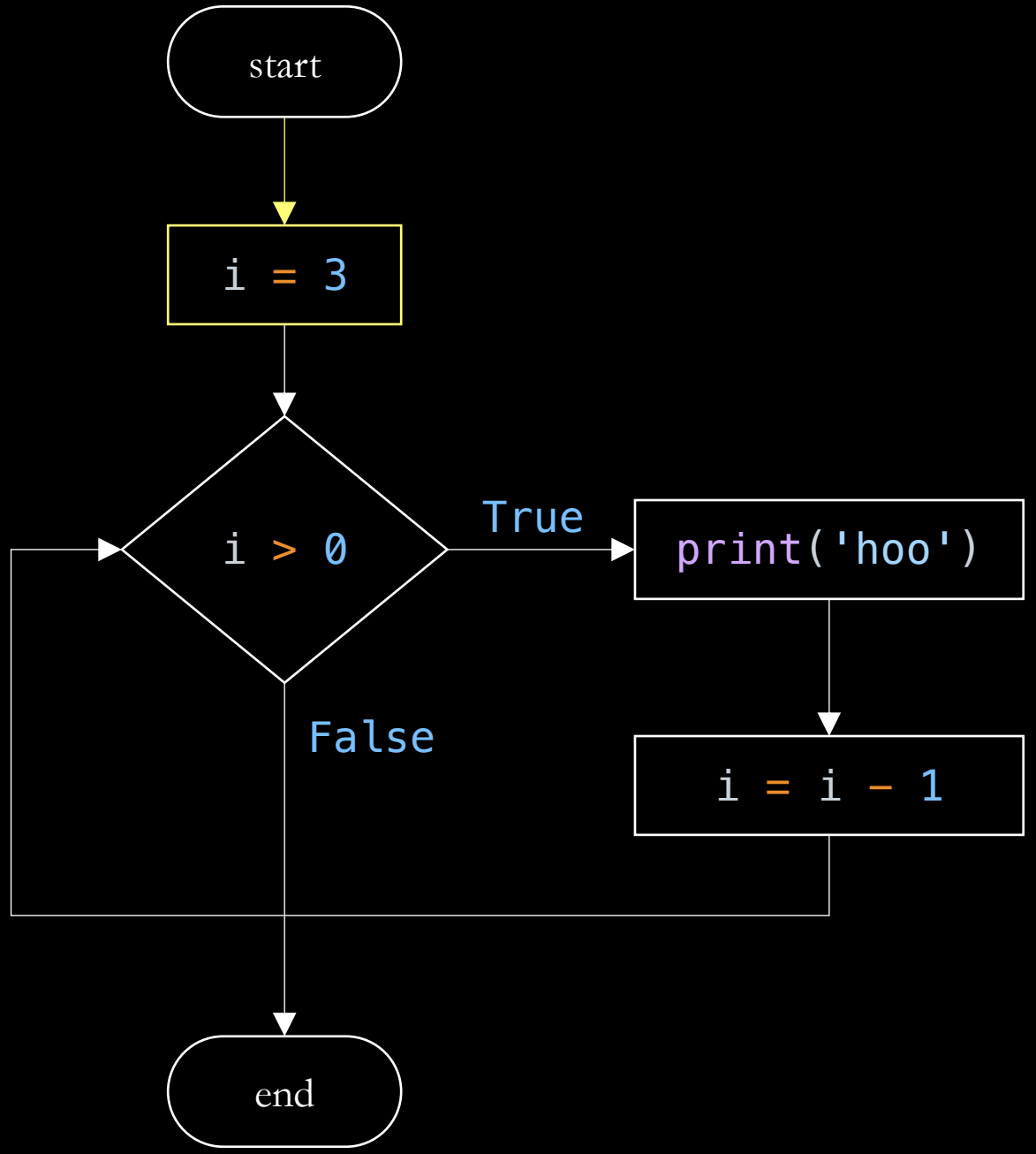

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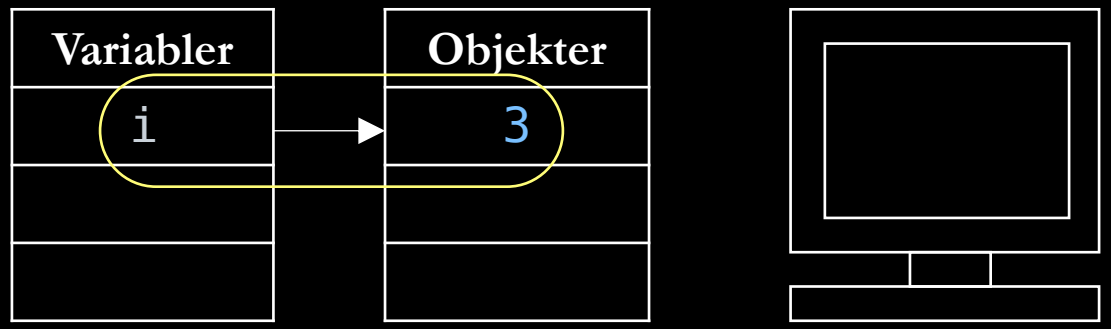

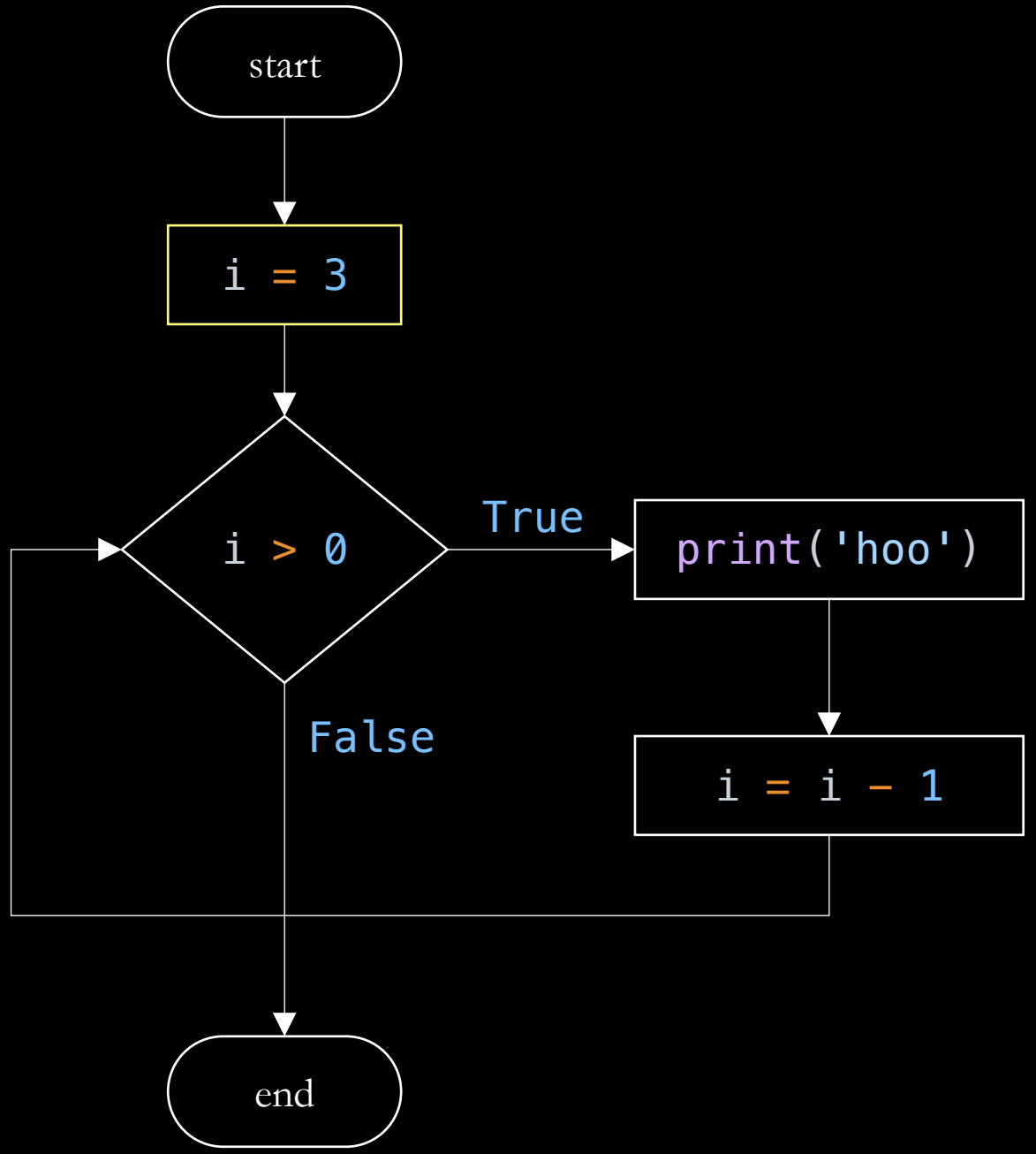

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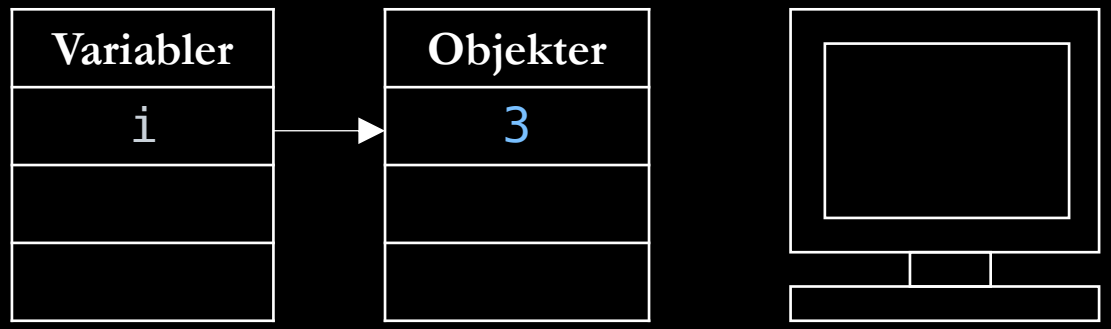
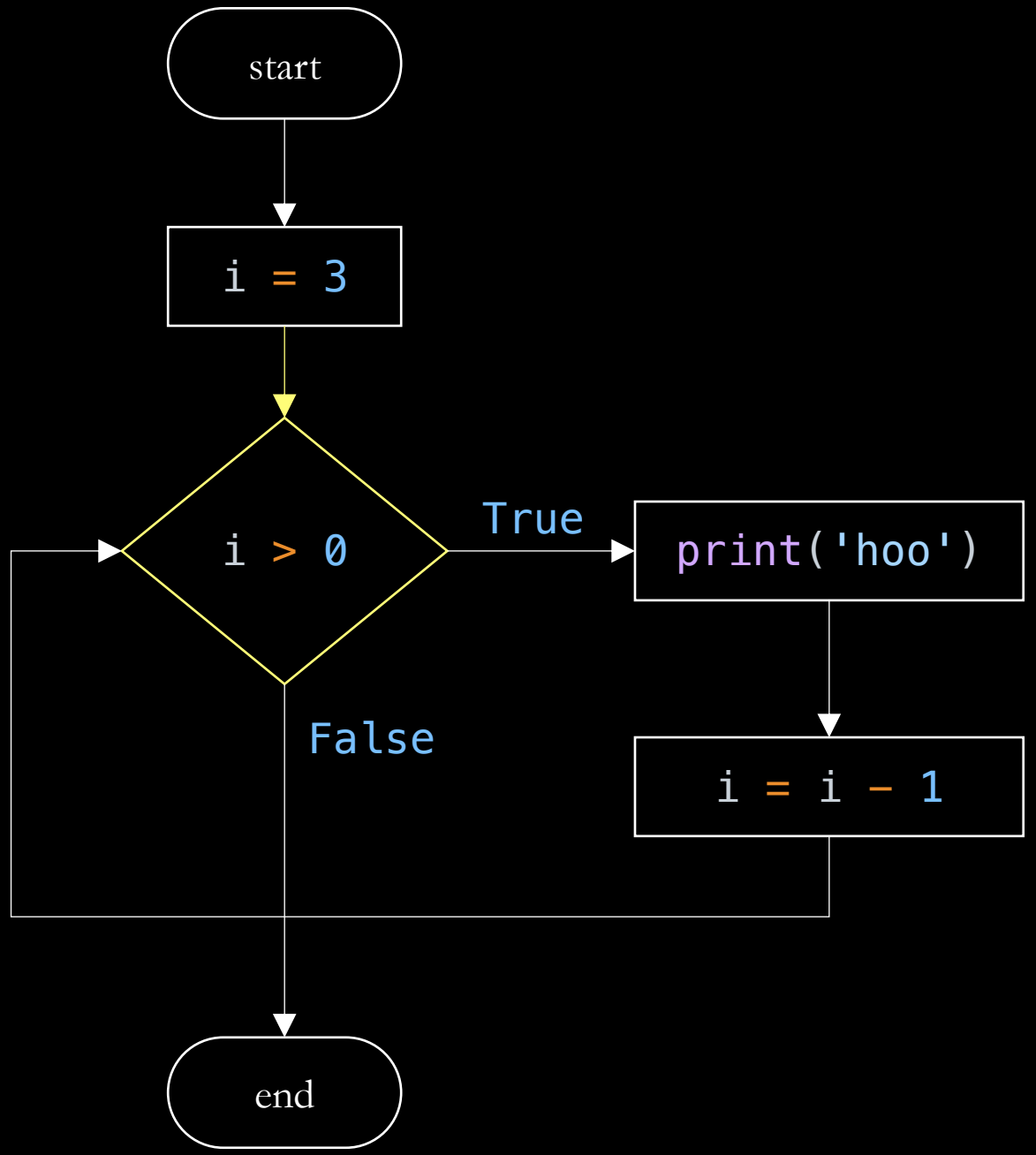
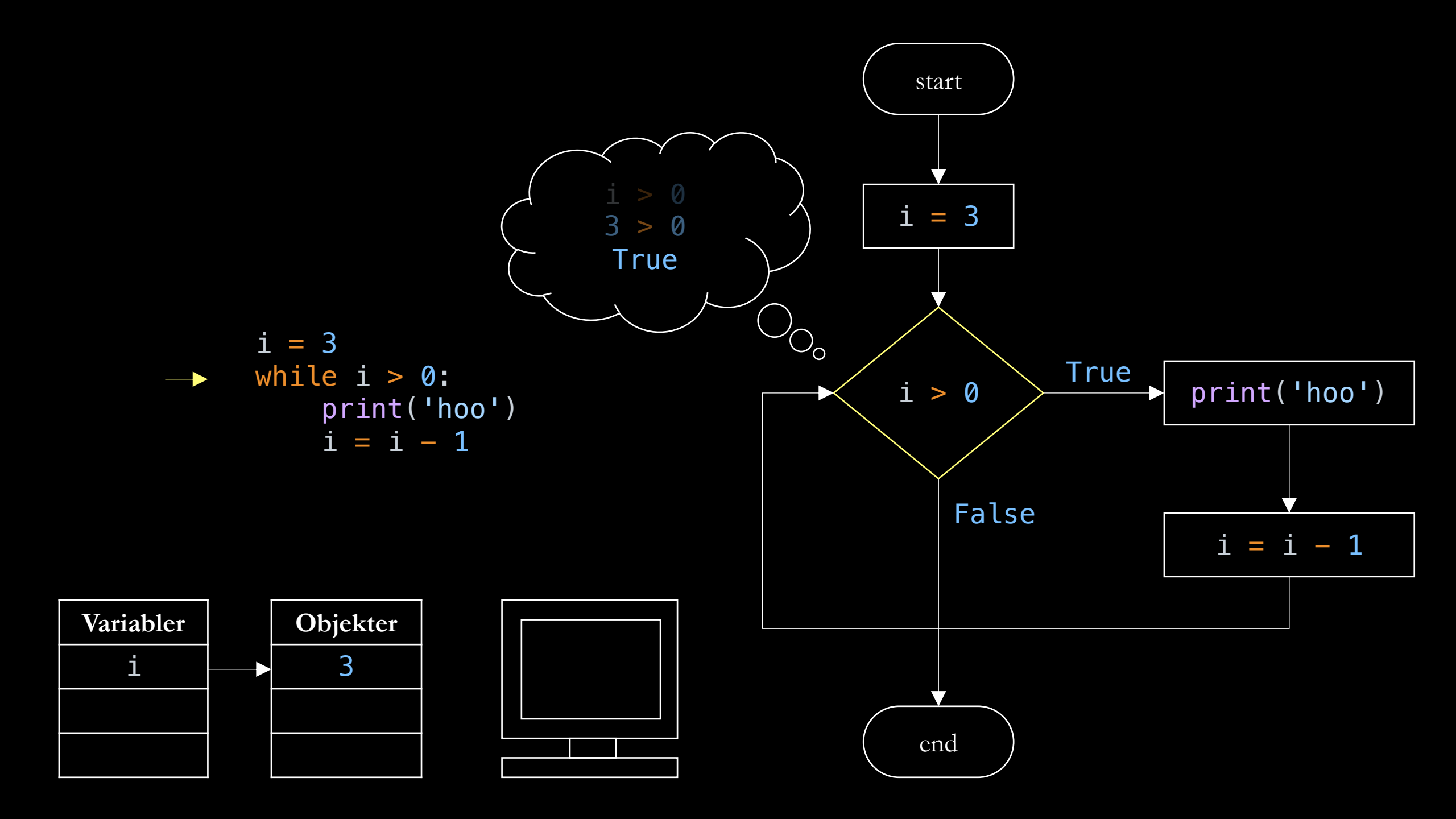
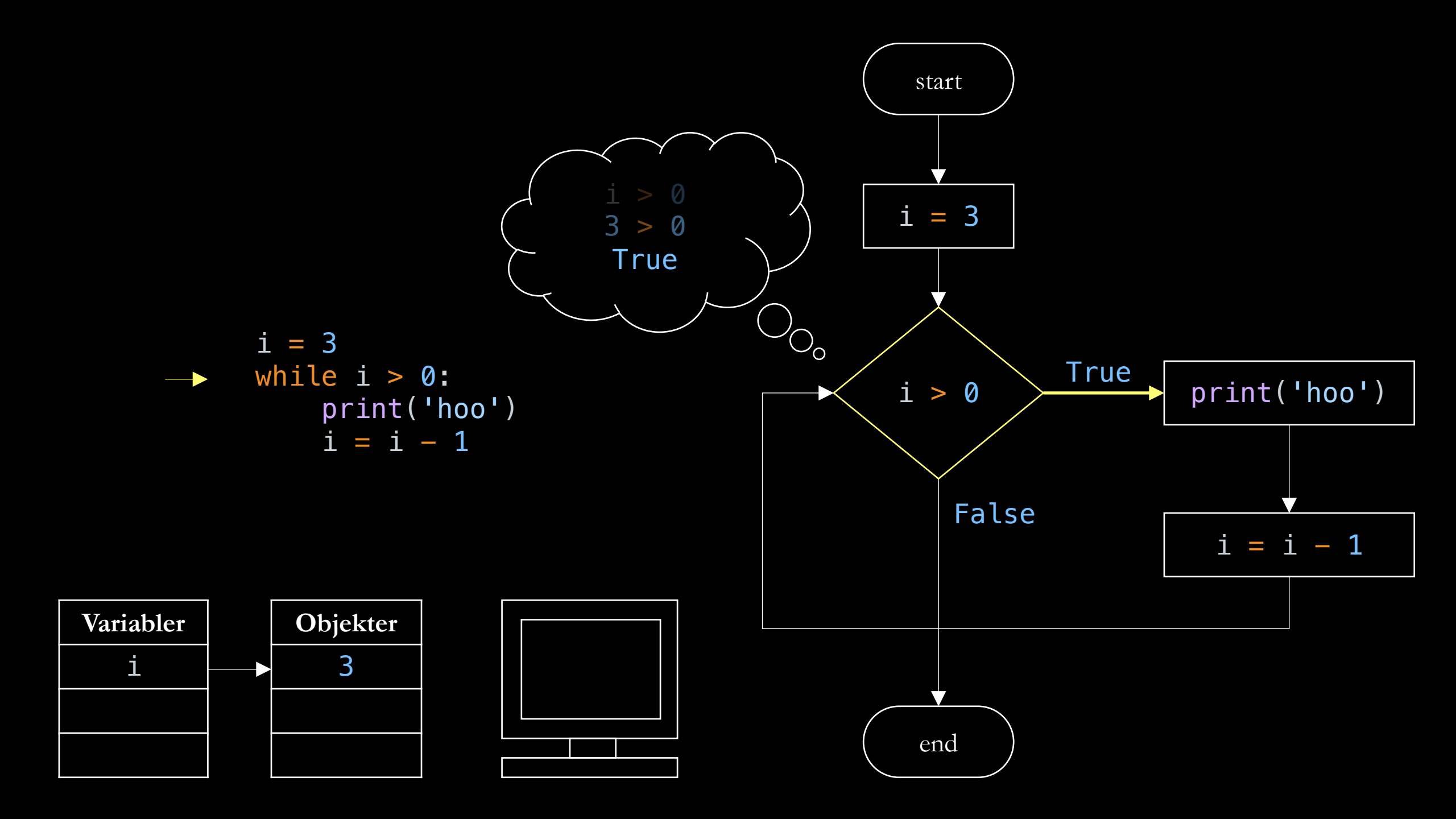





start
i = 3
i > 0
True
False
print('hoo')
i = i - 1
end
i > 0
3 > 0
True
i = 3
while i > 0:
print('hoo')
i = i - 1
Variabler
i
Objekter
3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i > 0
True
False
print('hoo')
i = i - 1
end
i > 0
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True
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Variabler
i
Objekter
3

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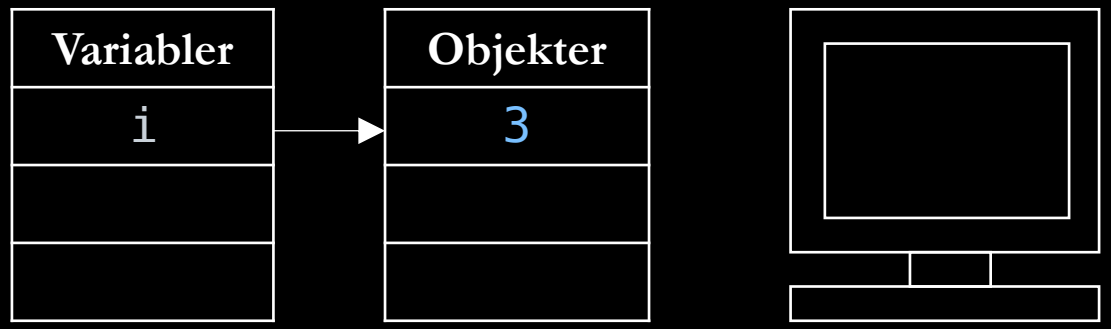

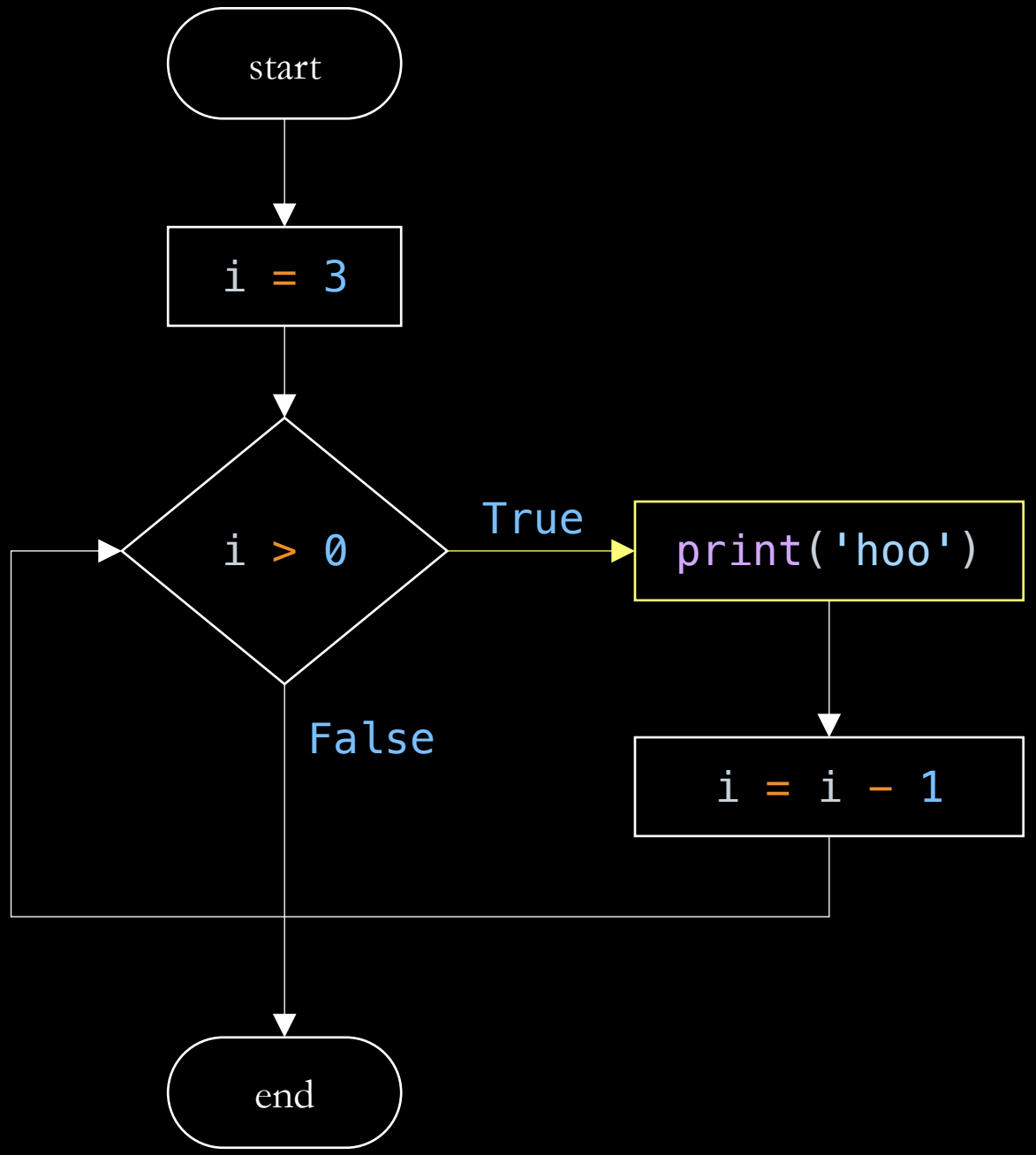

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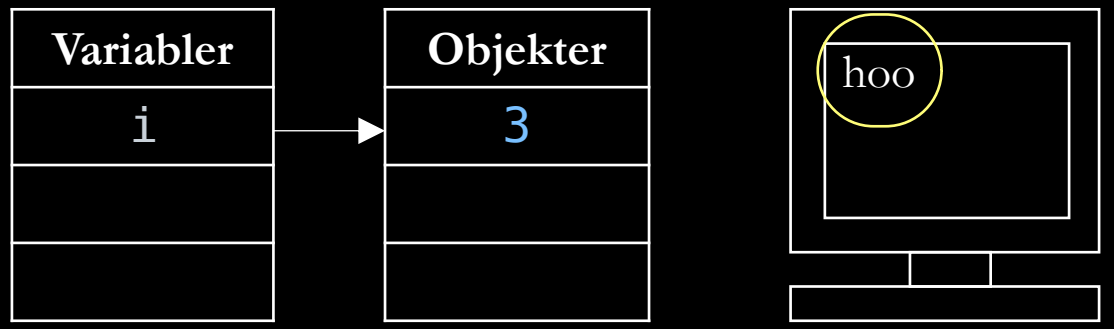

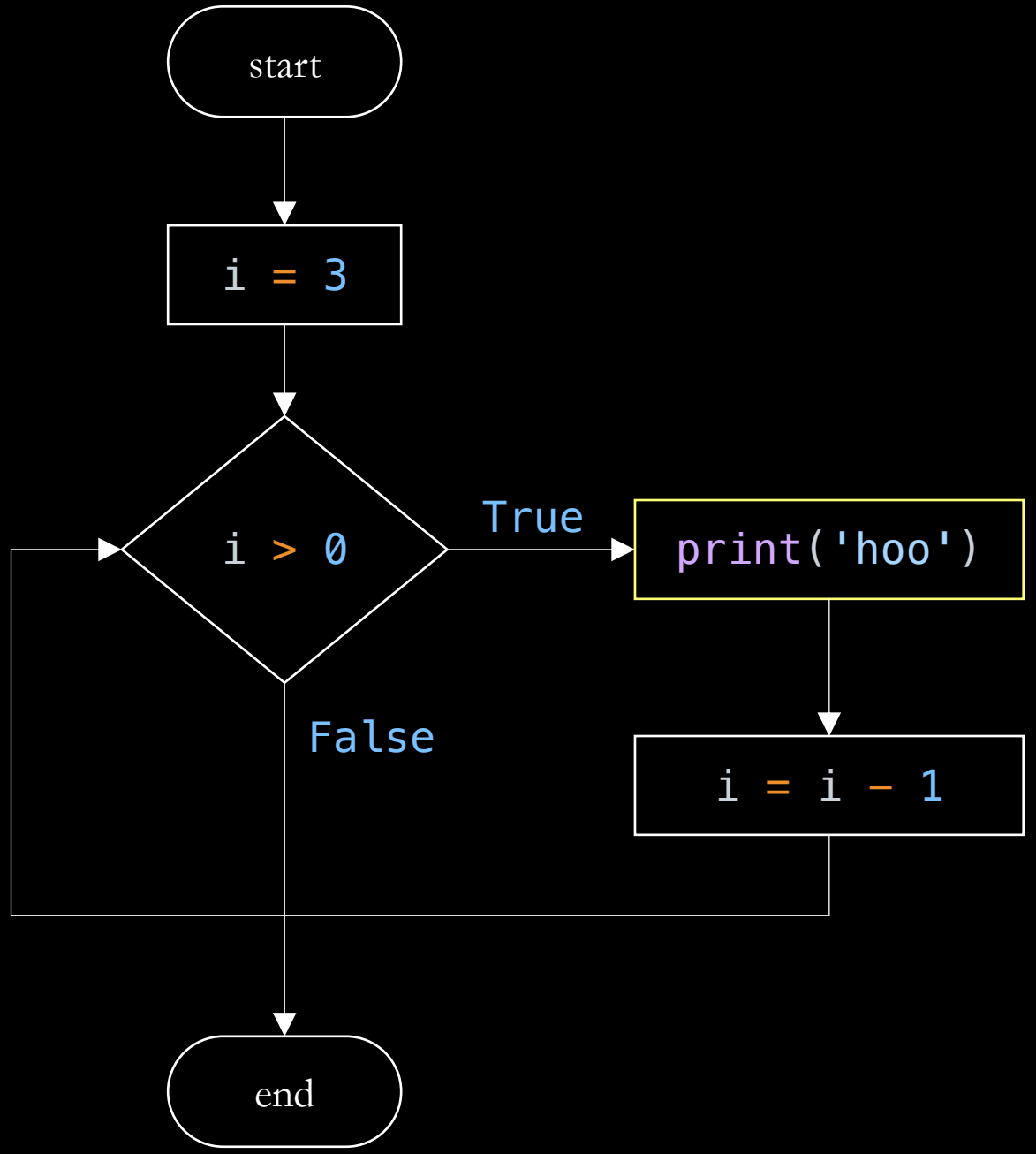

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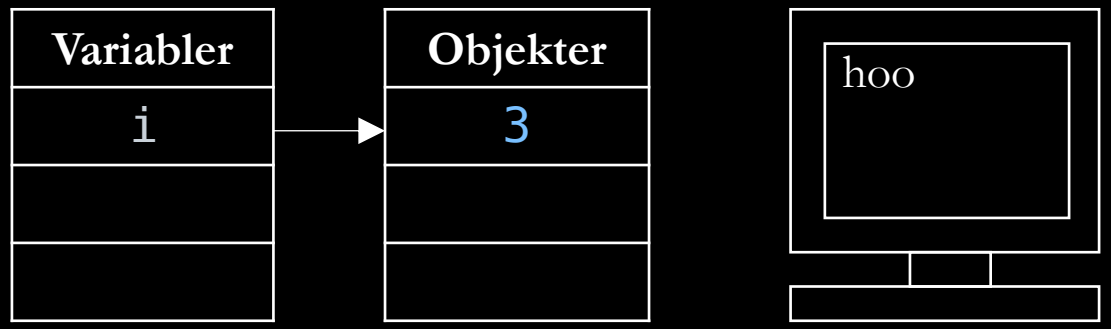

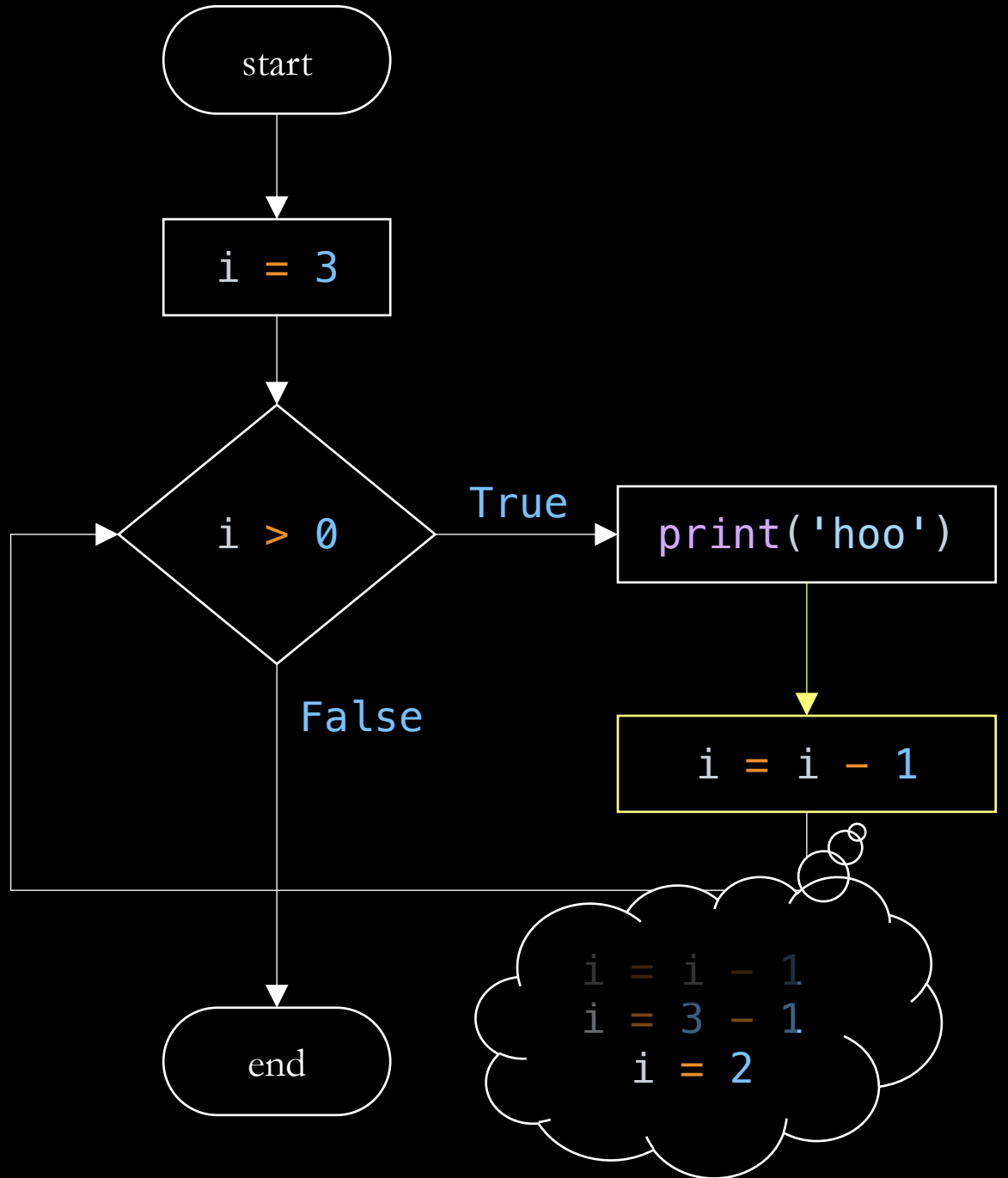

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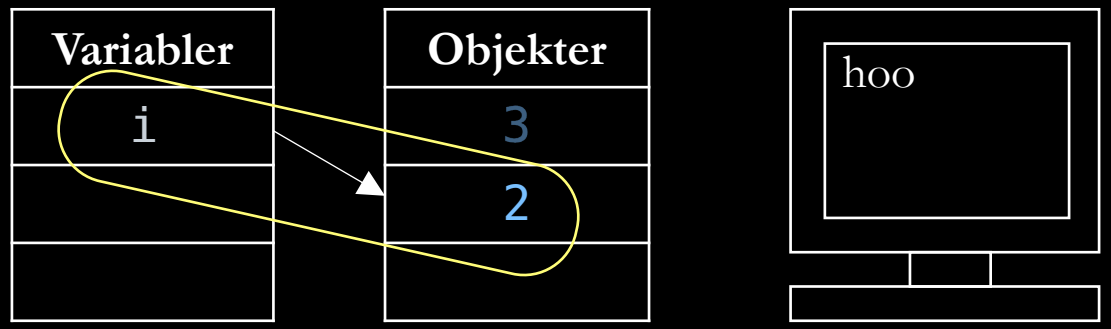

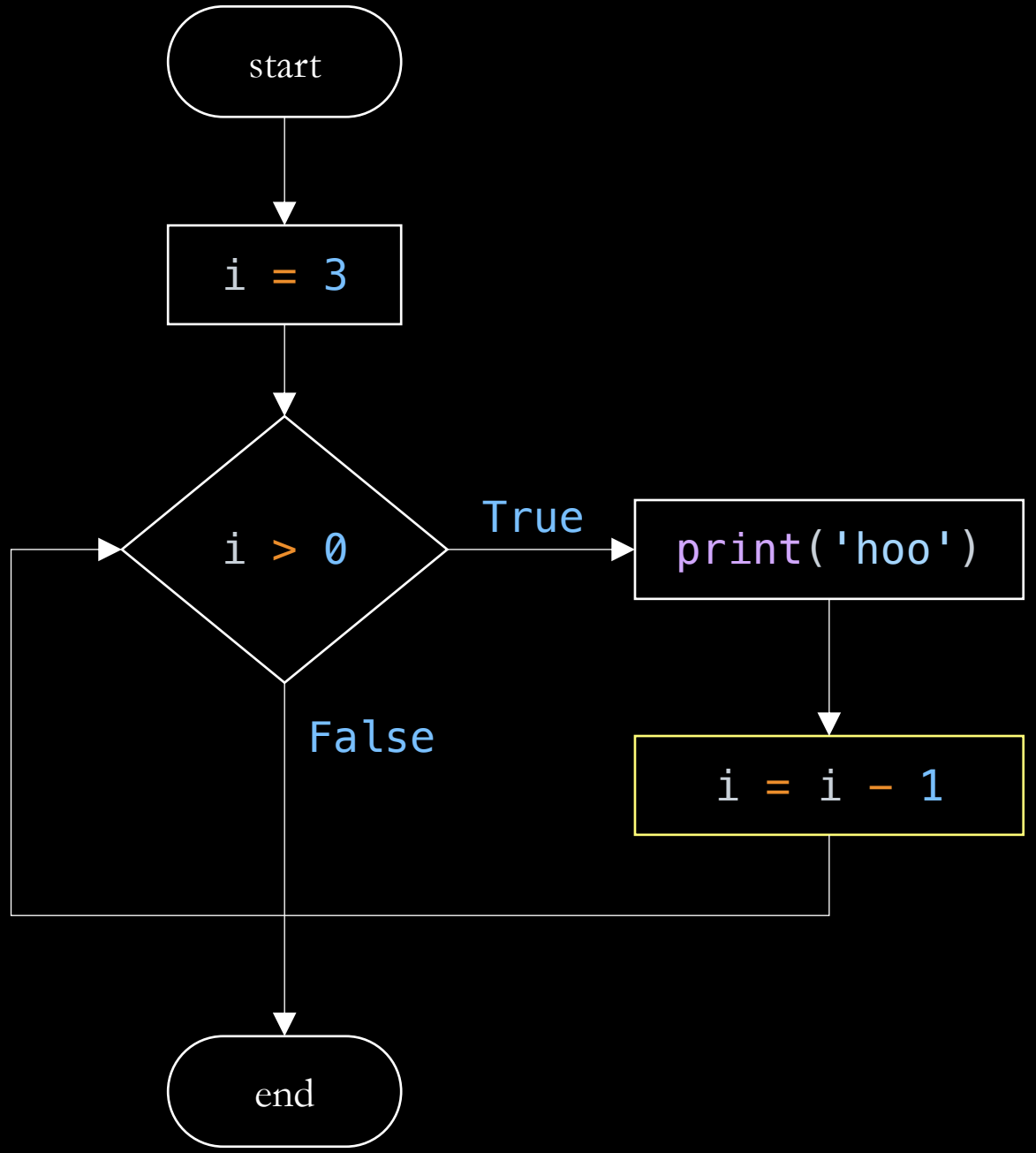

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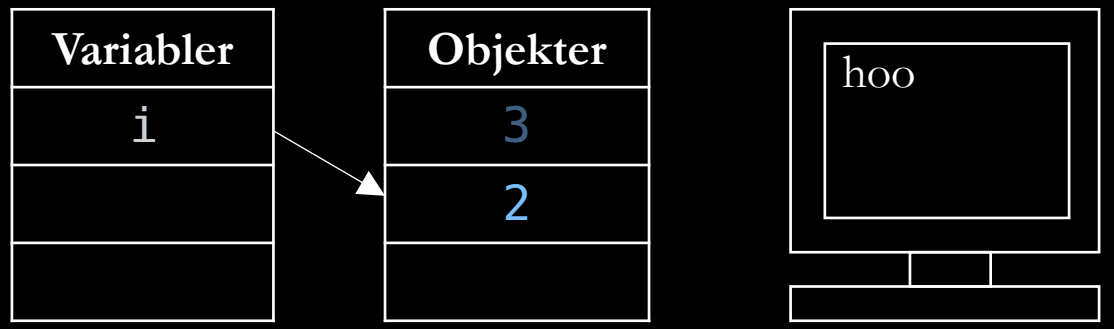
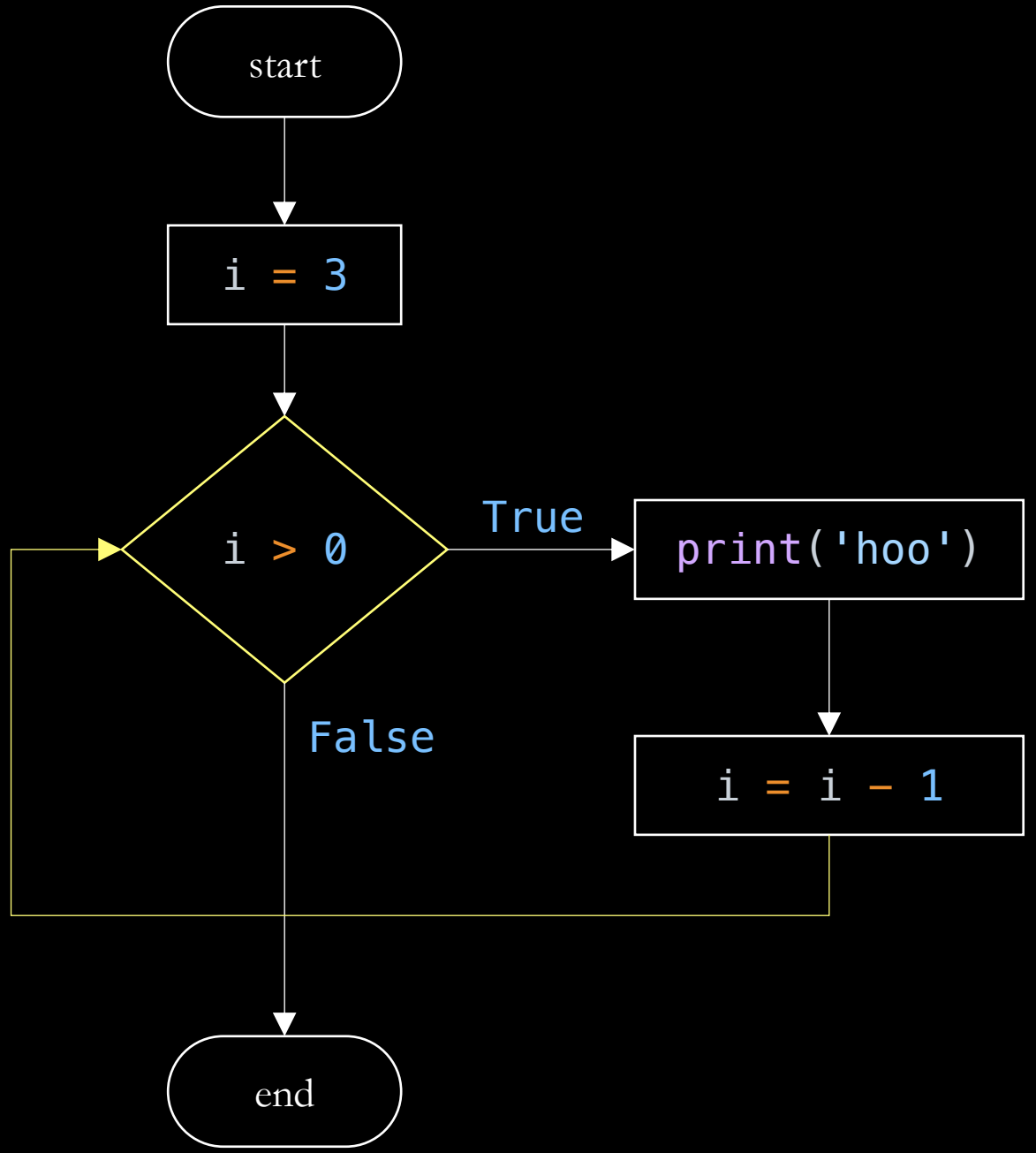
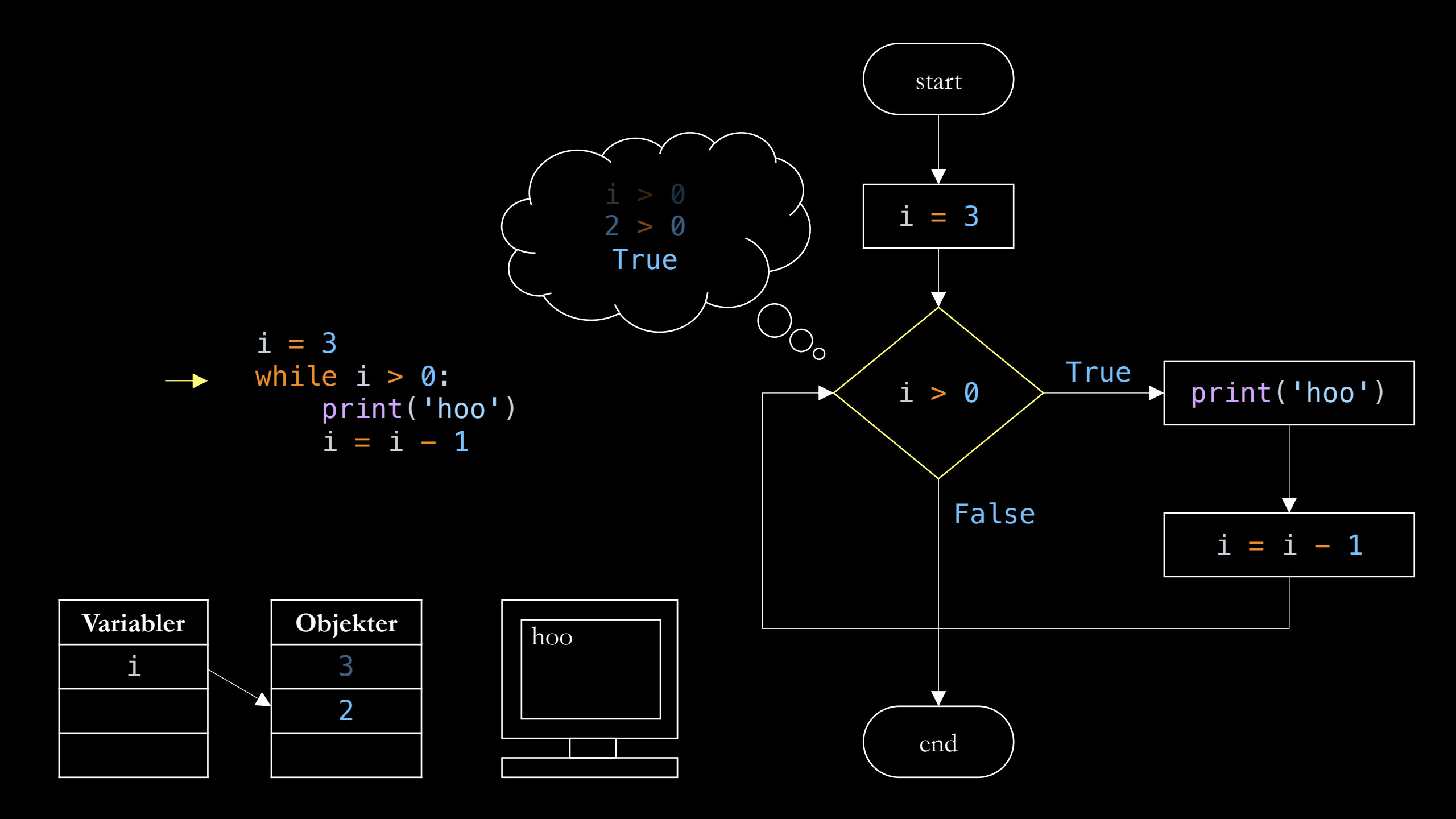
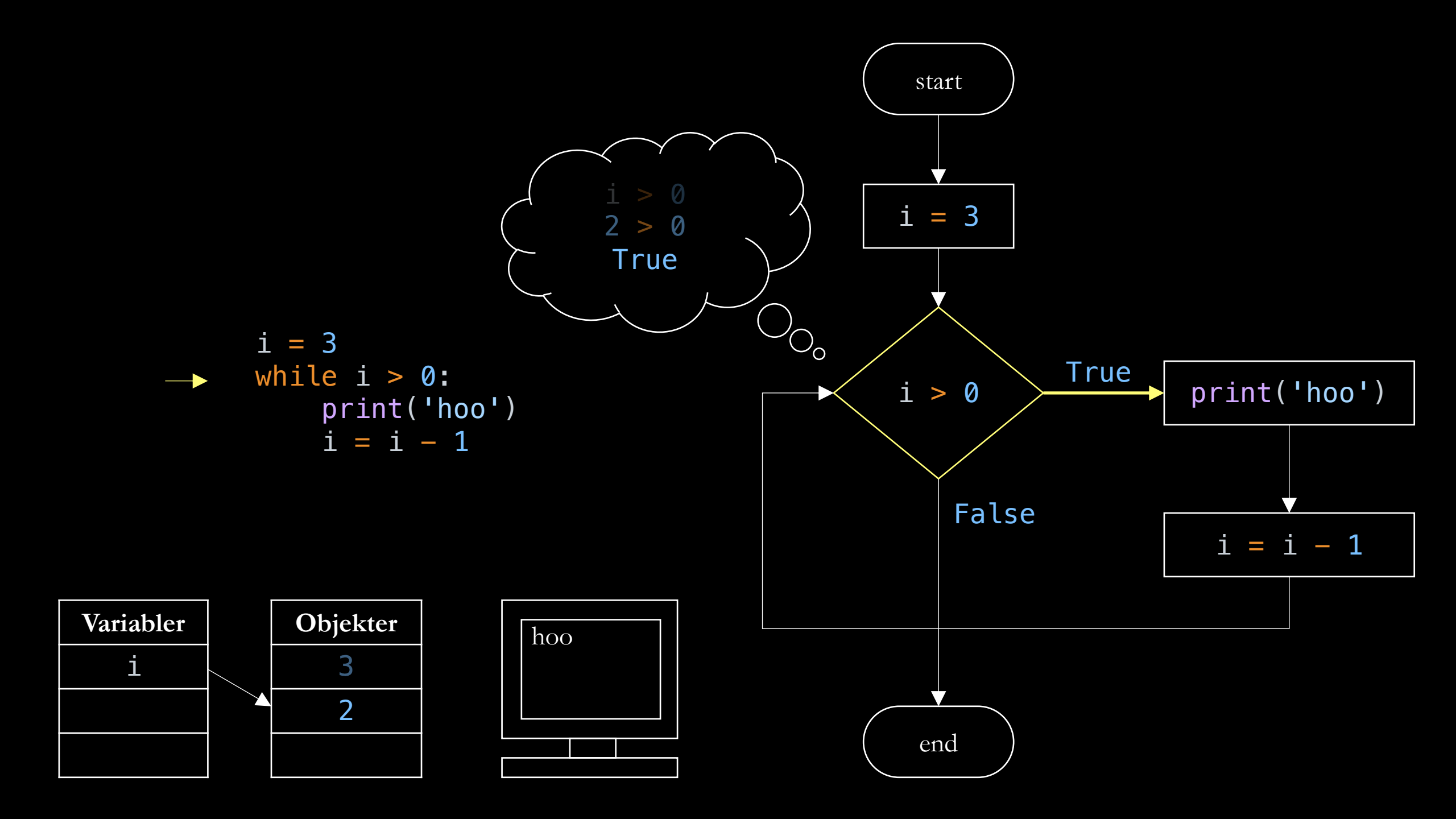





start
i = 3
i > 0
True
False
print('hoo')
i = i - 1
end
i = 3
while i > 0:
print('hoo')
i = i - 1
i > 0
2 > 0
True
Variabler
i
Objekter
3
2
hoo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i > 0
True
False
print('hoo')
i = i - 1
end
i = 3
while i > 0:
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i = i - 1
i > 0
2 > 0
True
Variabler
i
Objekter
3
2
hoo

```
i = 3
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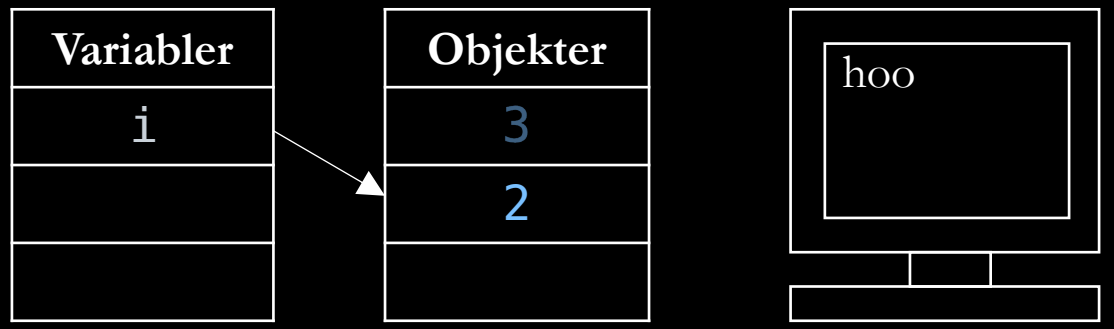
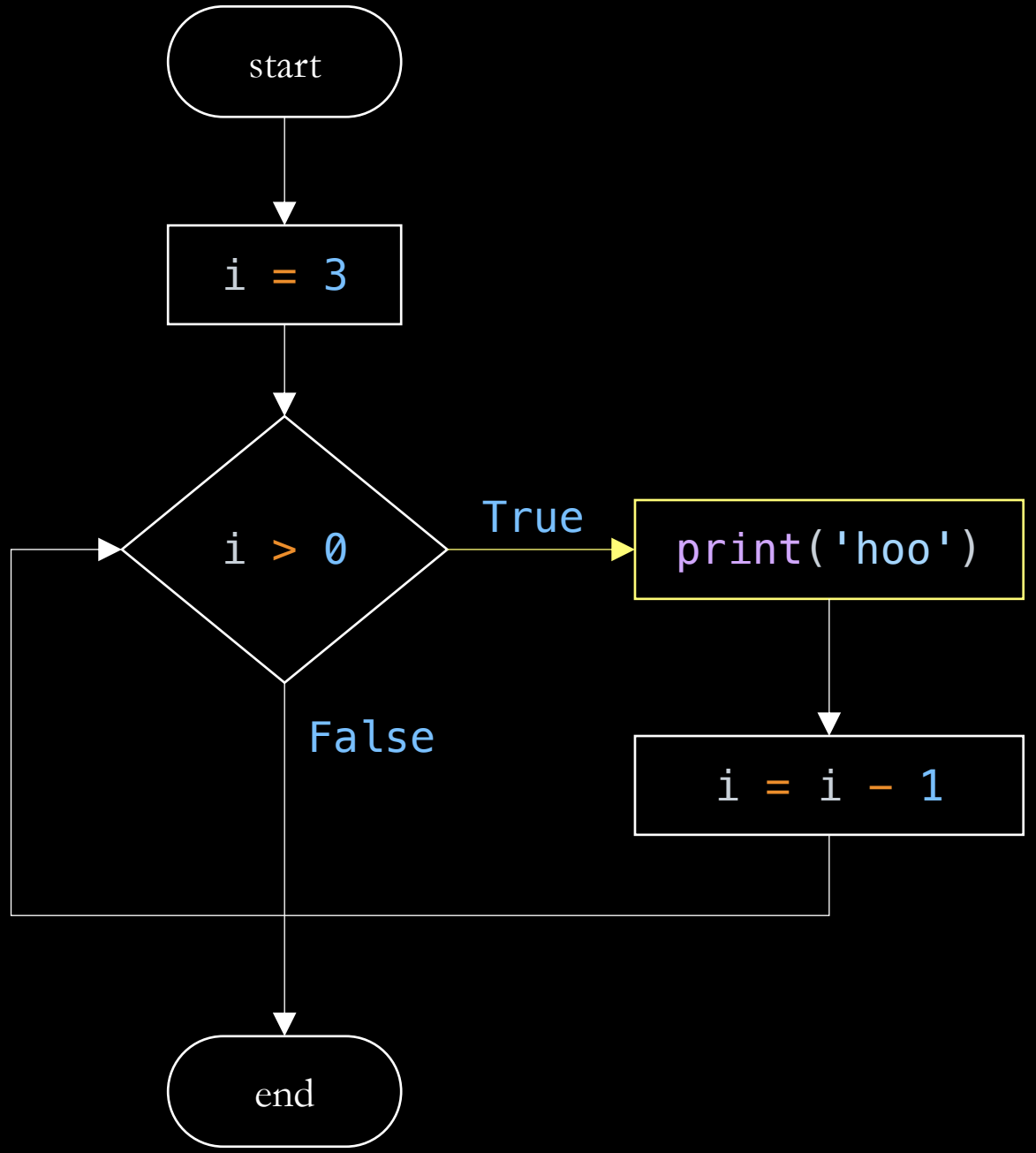
    i = i - 1
```





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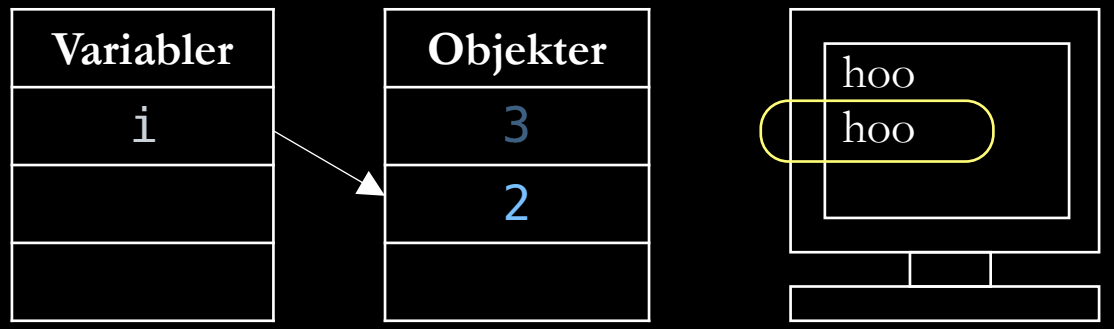

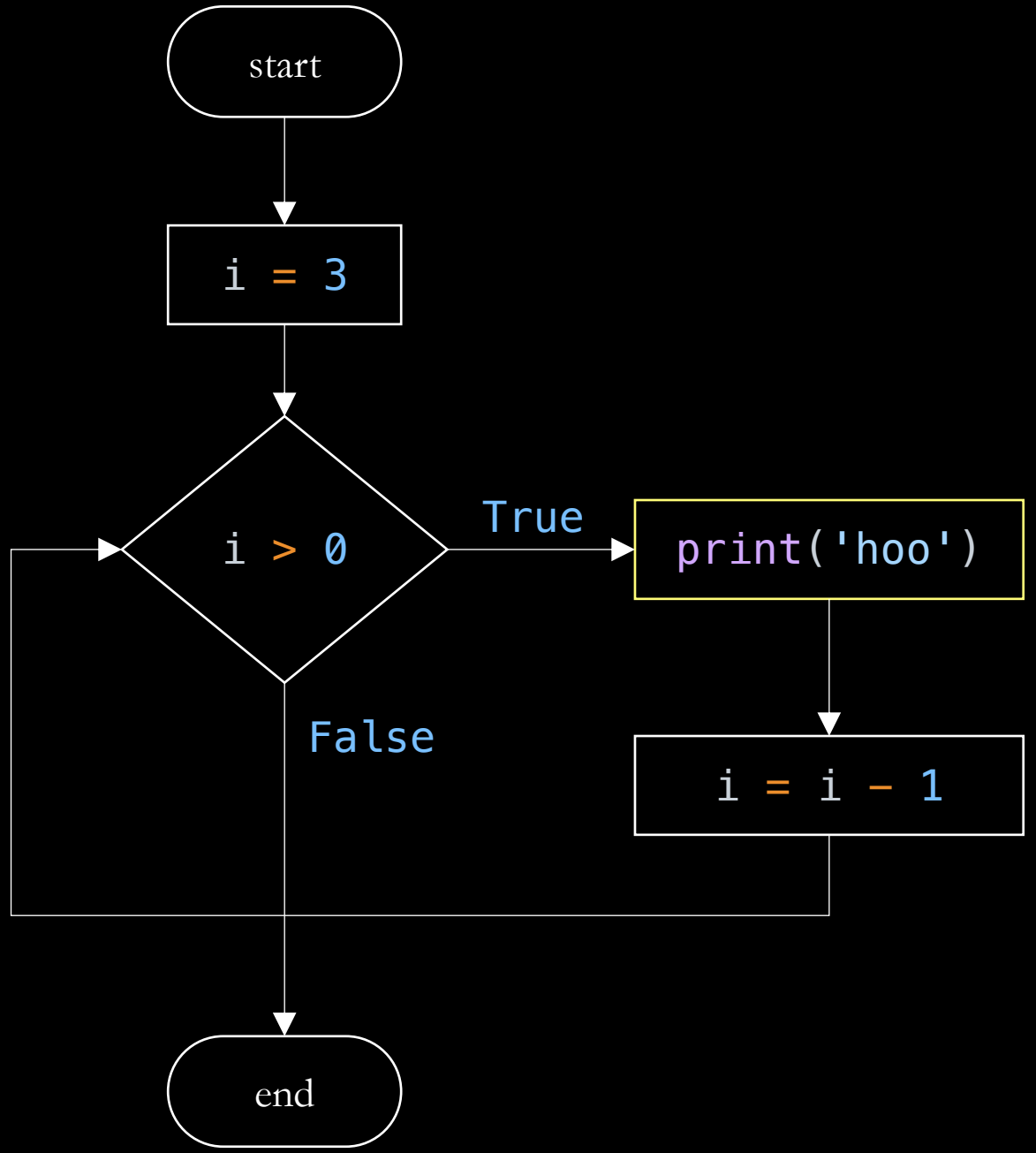

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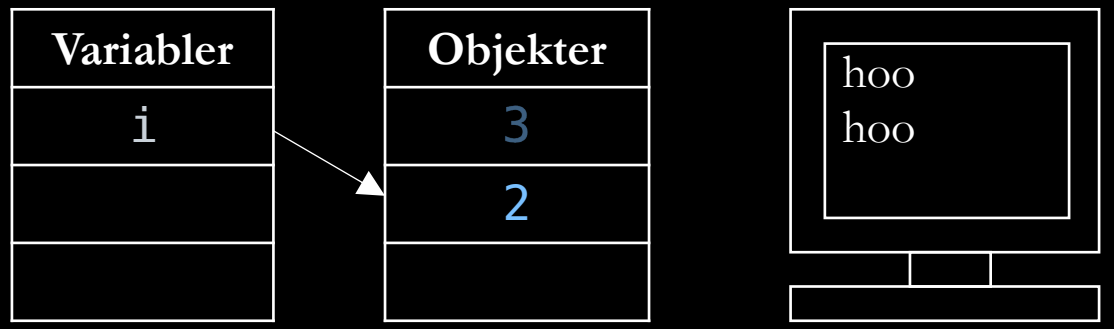
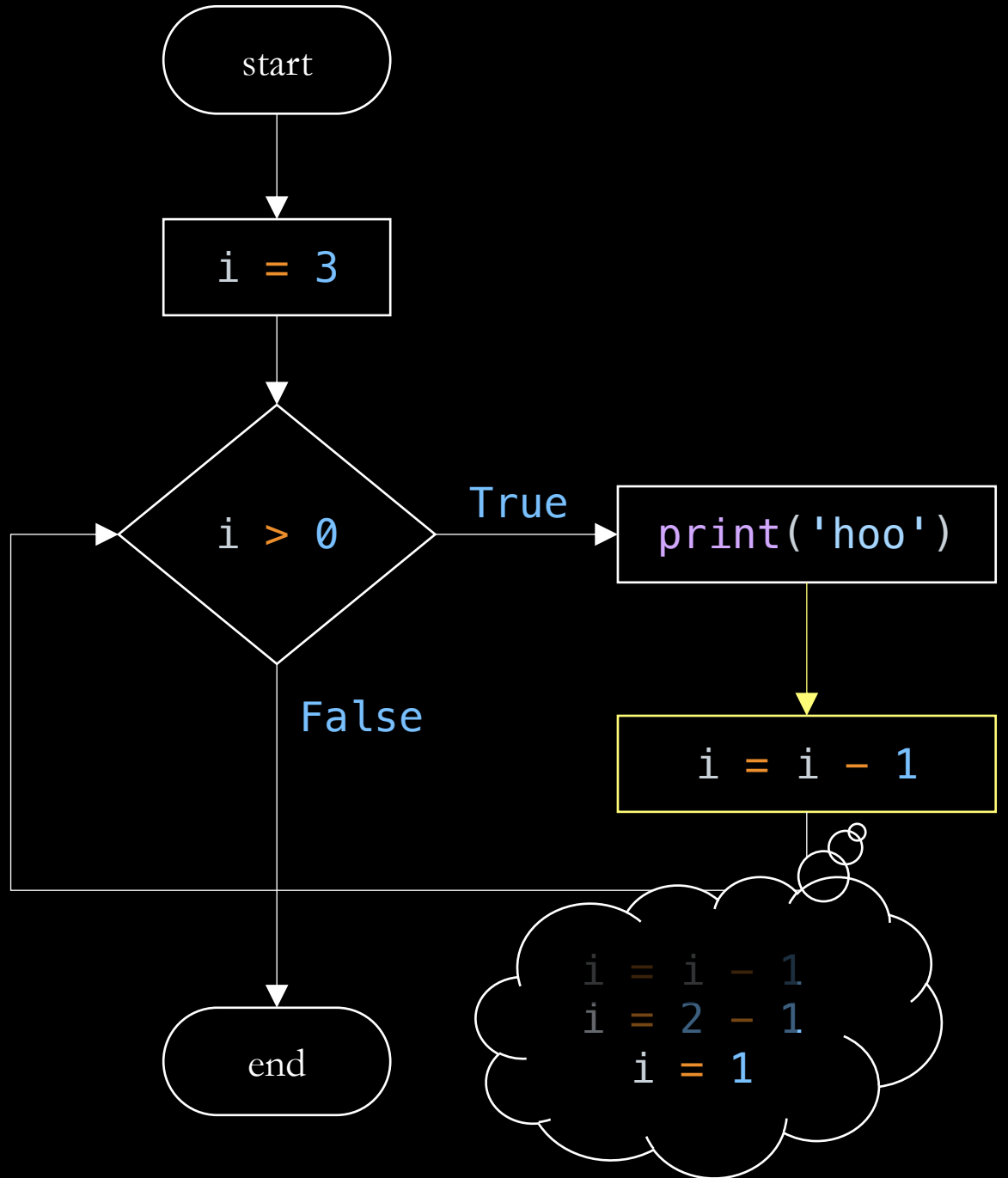
```





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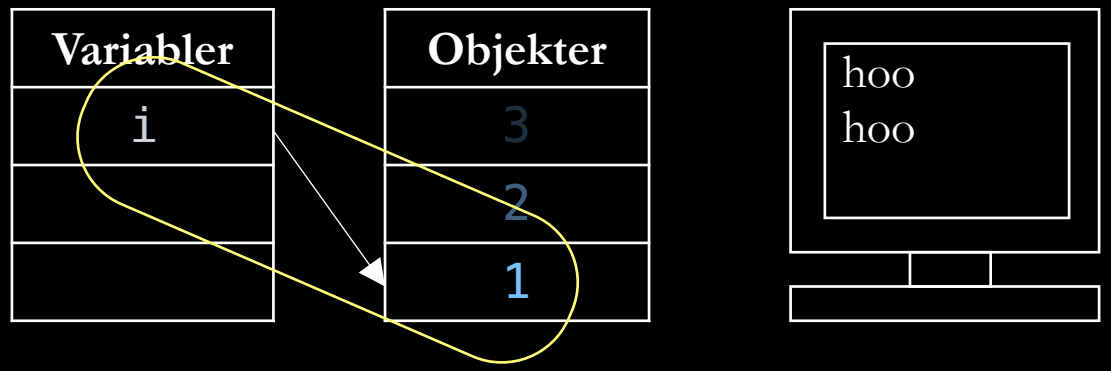

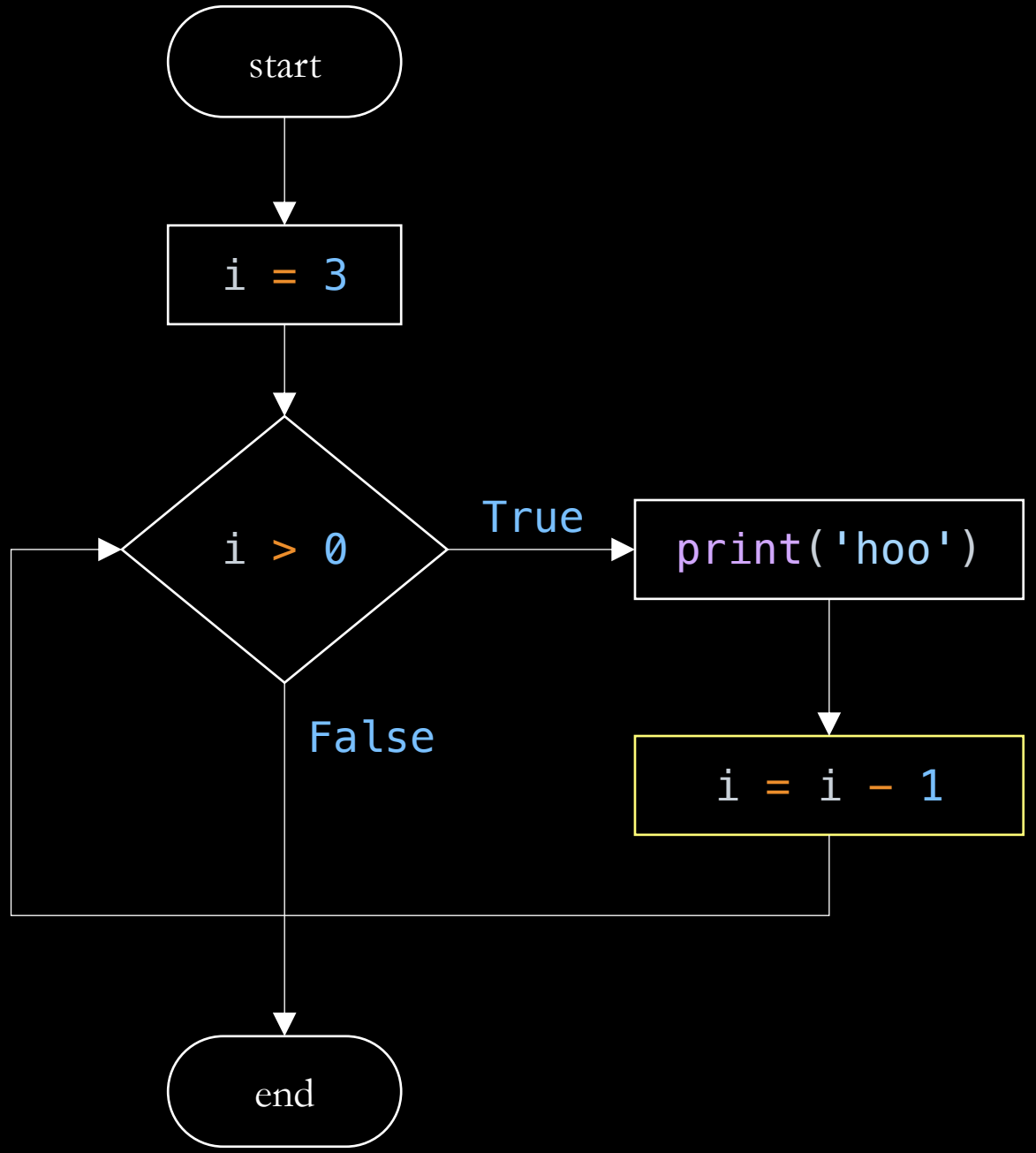

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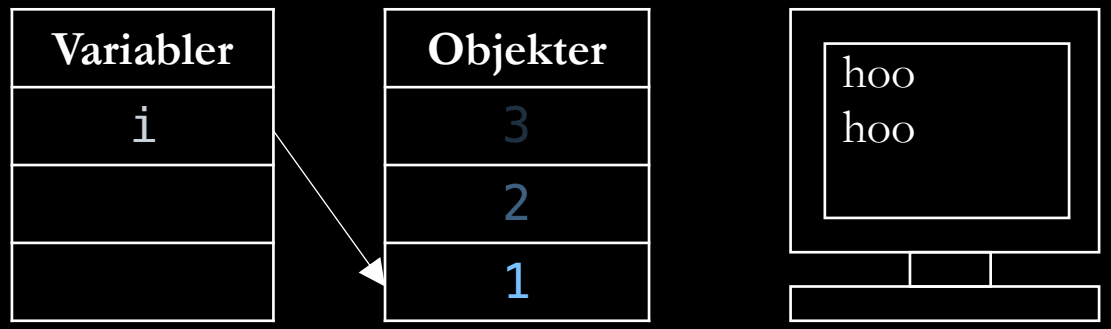
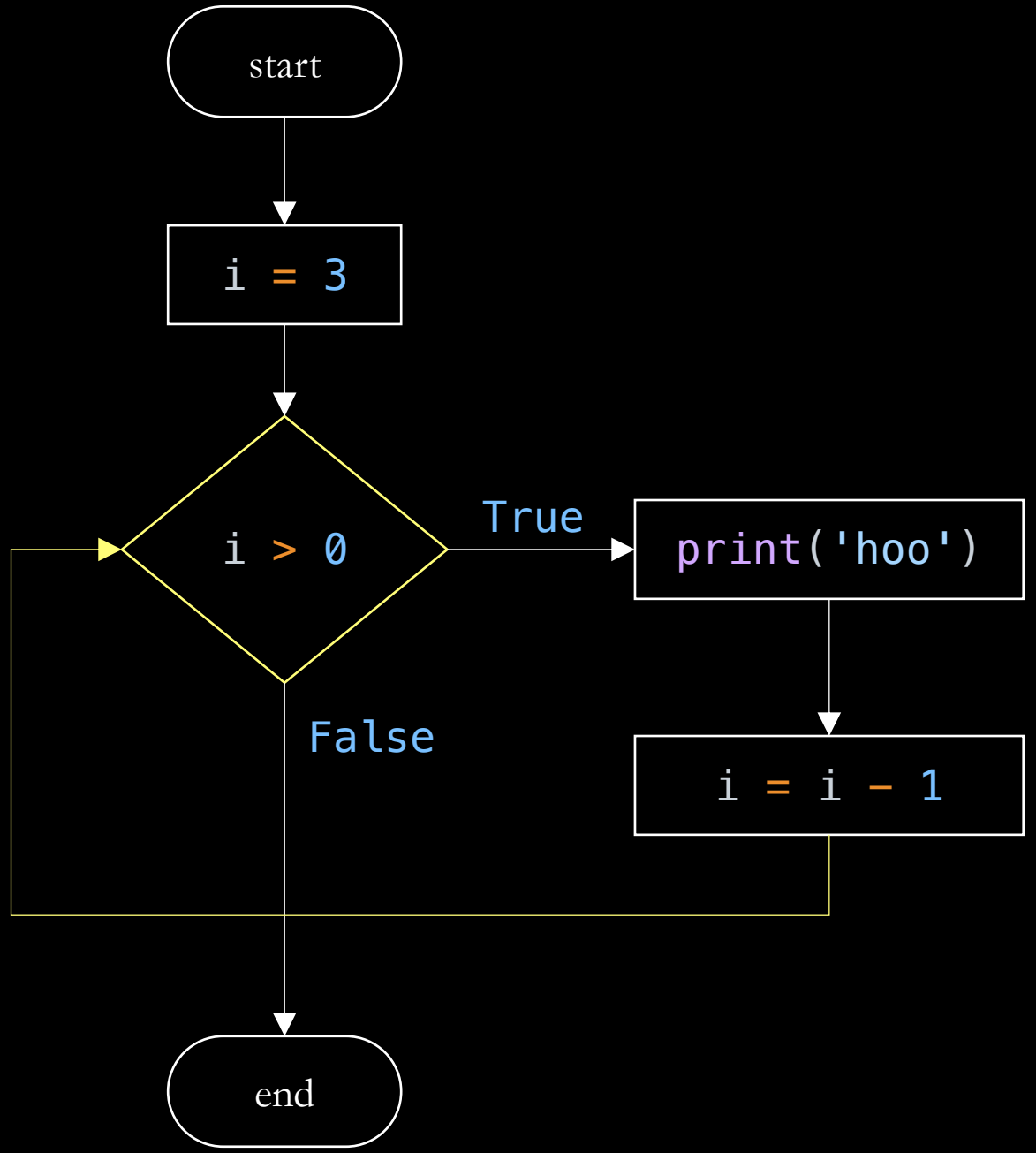
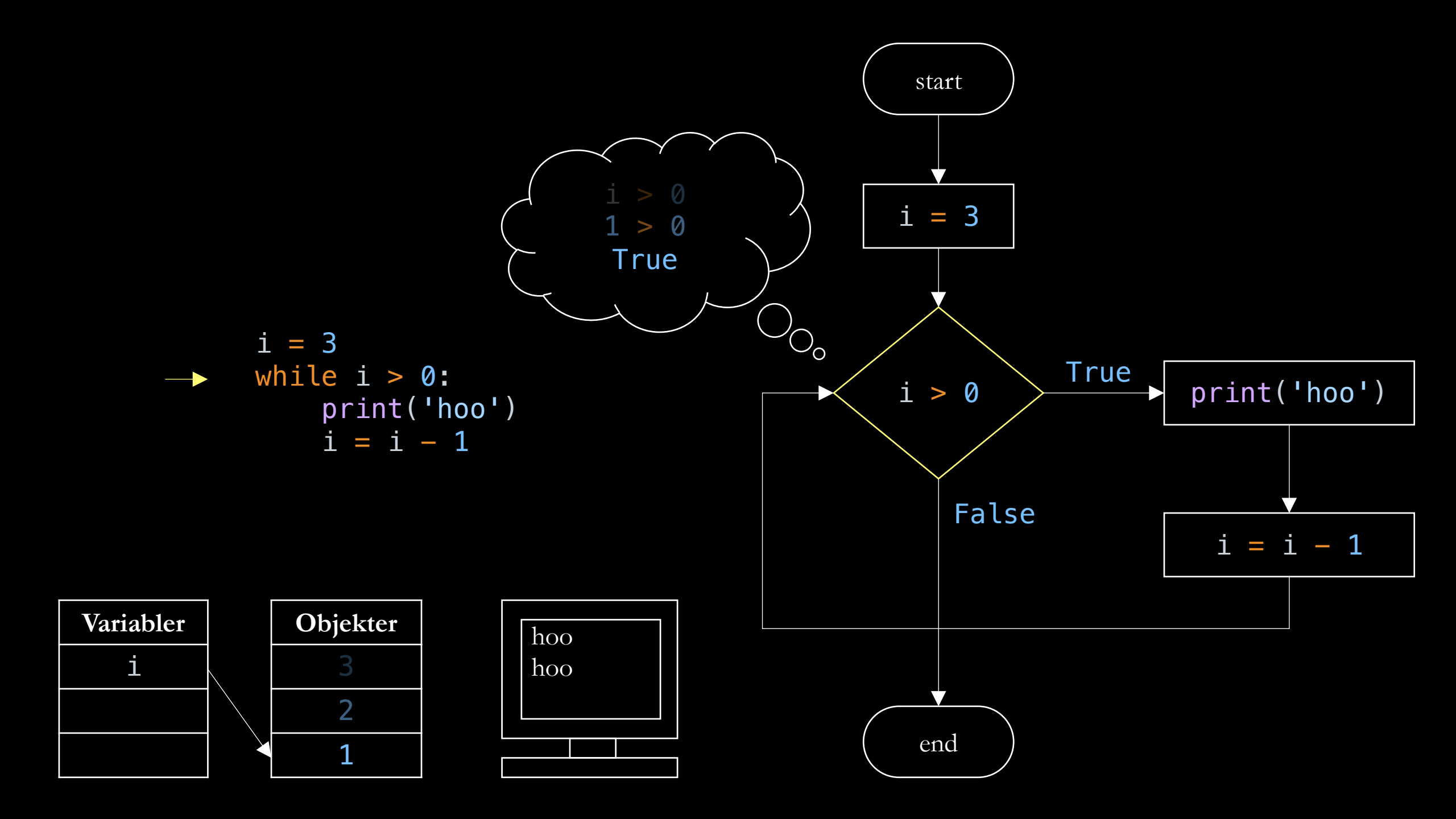
    i = i - 1
```



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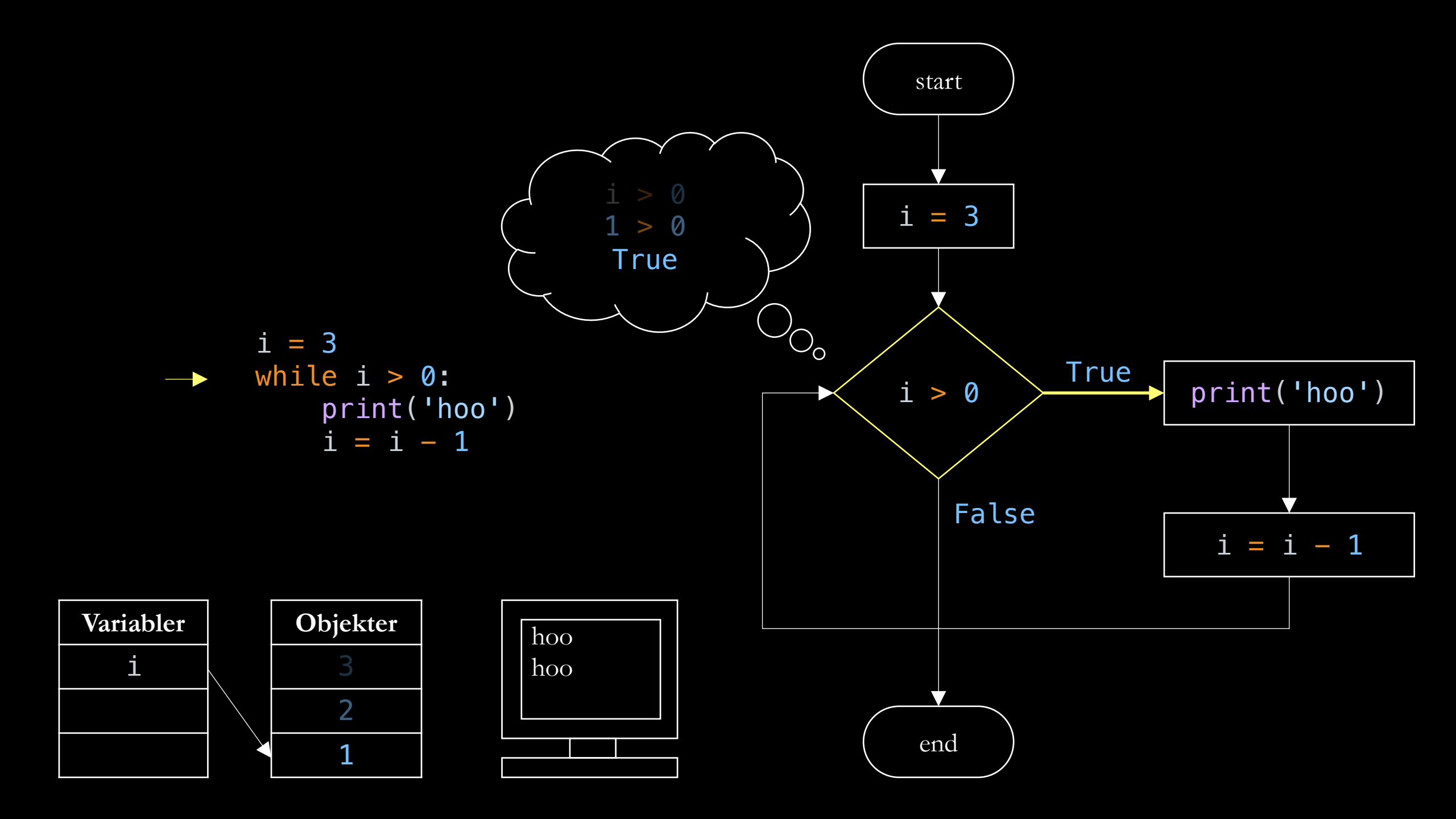
i = 3
i > 0
True
False
print('hoo')
i = i - 1
end
i = 3
while i > 0:
print('hoo')
i = i - 1
i > 0
1 > 0
True
Variabler
i
Objekter
3
2
1
hoo
hoo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True
False
print('hoo')
i = i - 1
end
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i = i - 1
i > 0
1 > 0
True
Variabler
i
Objekter
3
2
1
hoo
hoo

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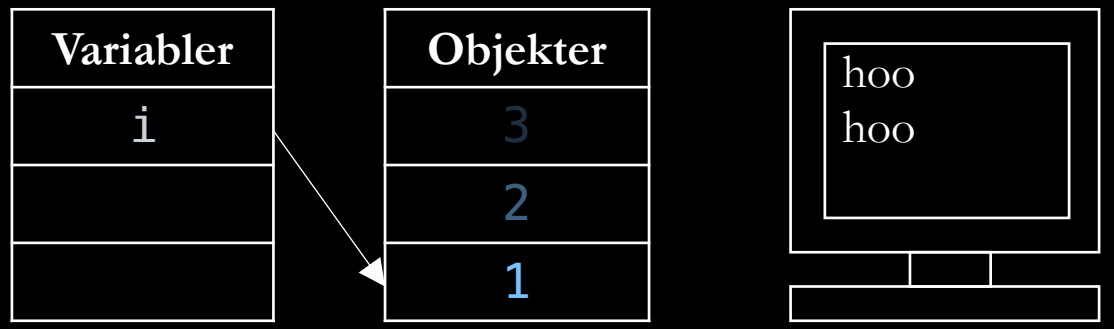

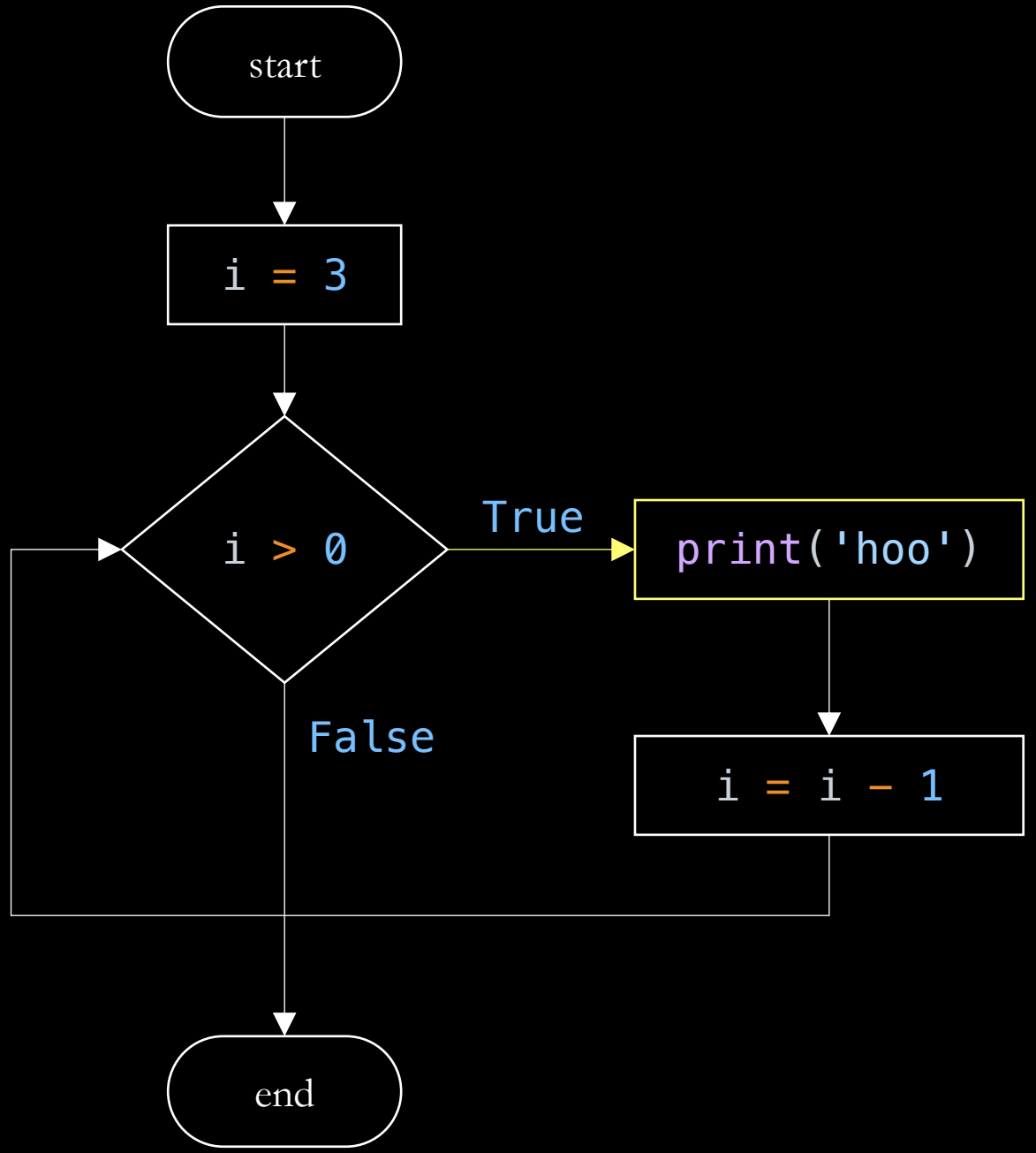

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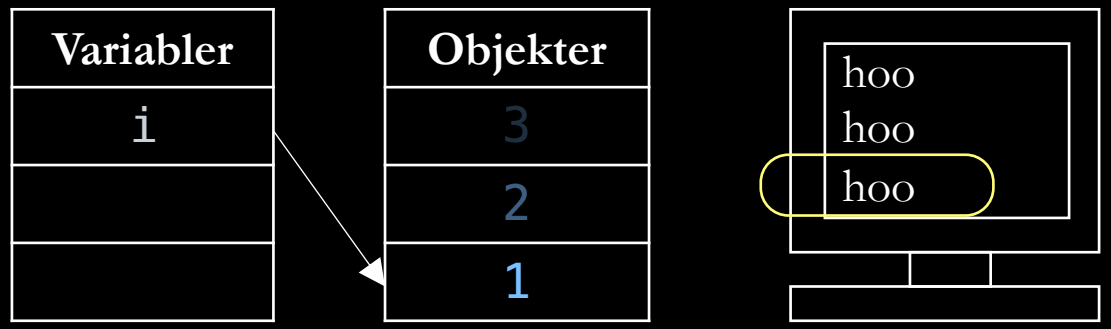

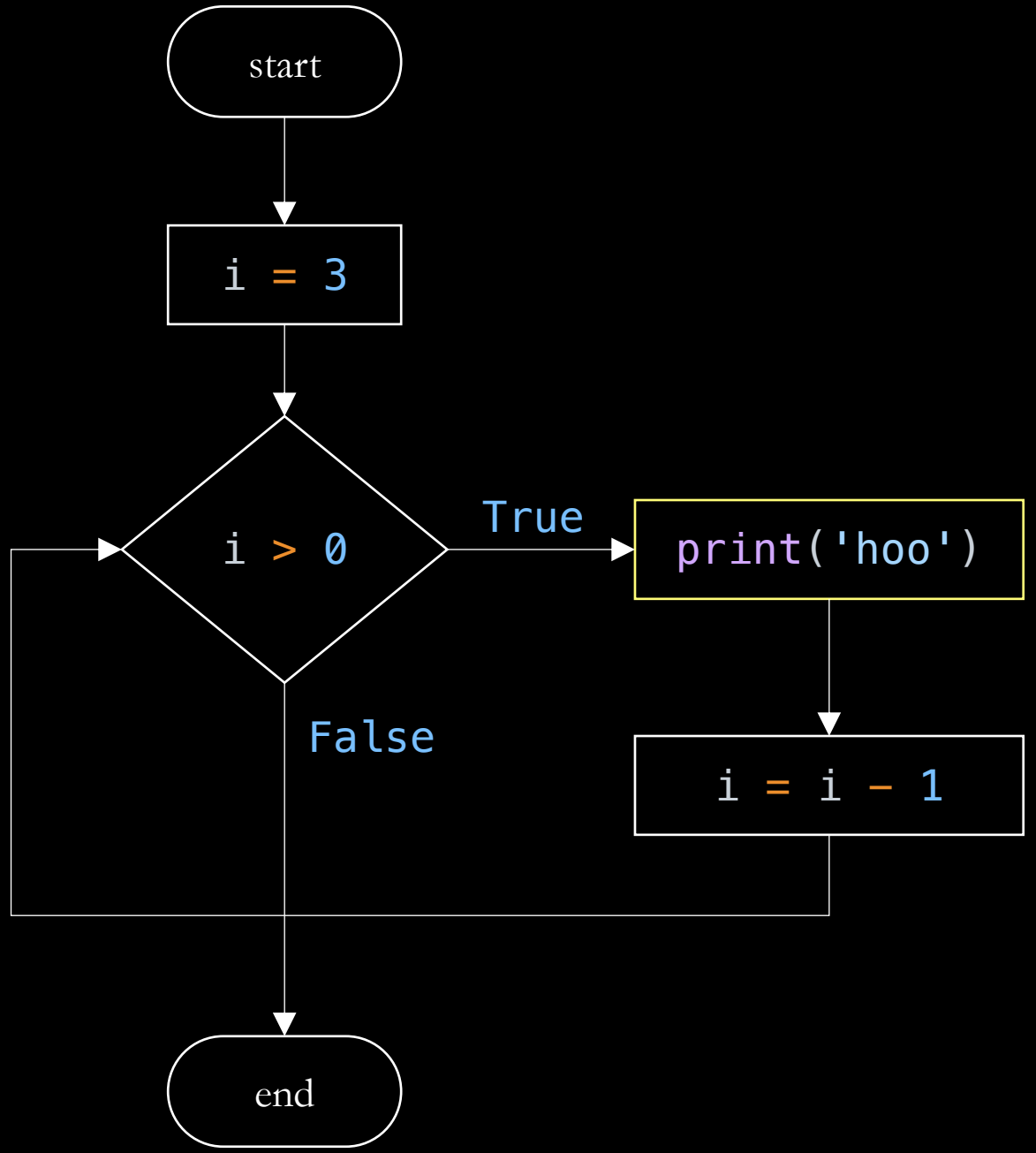

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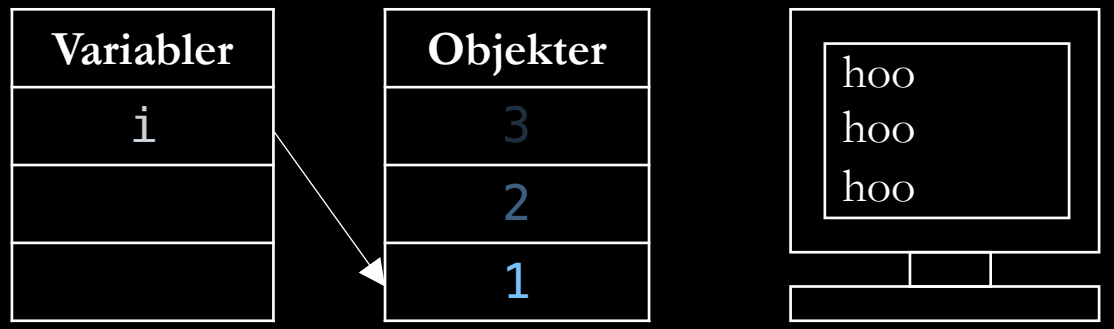
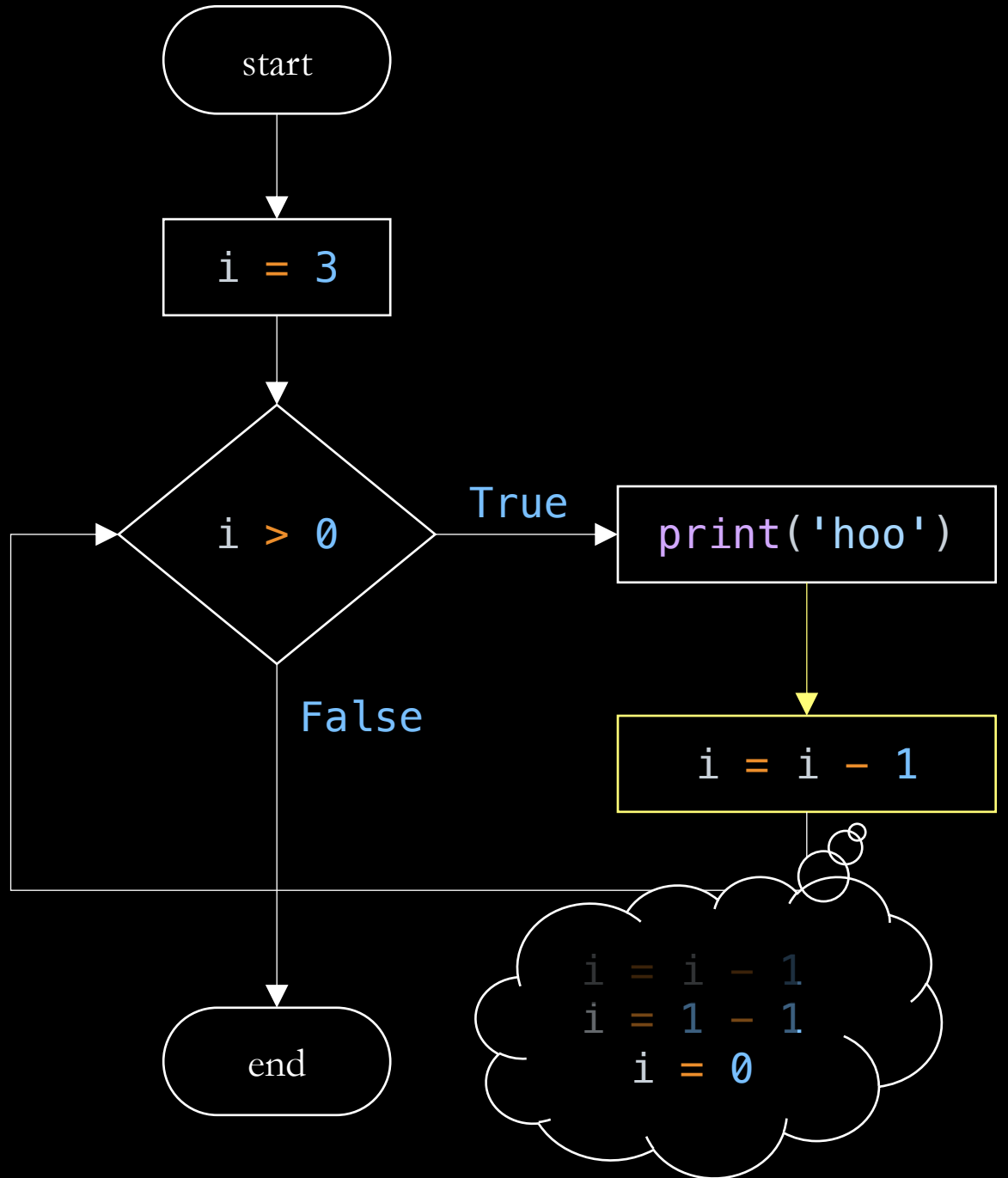
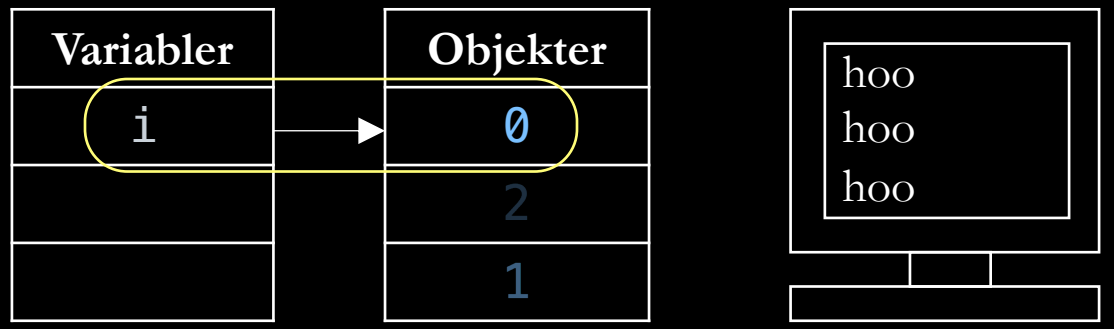
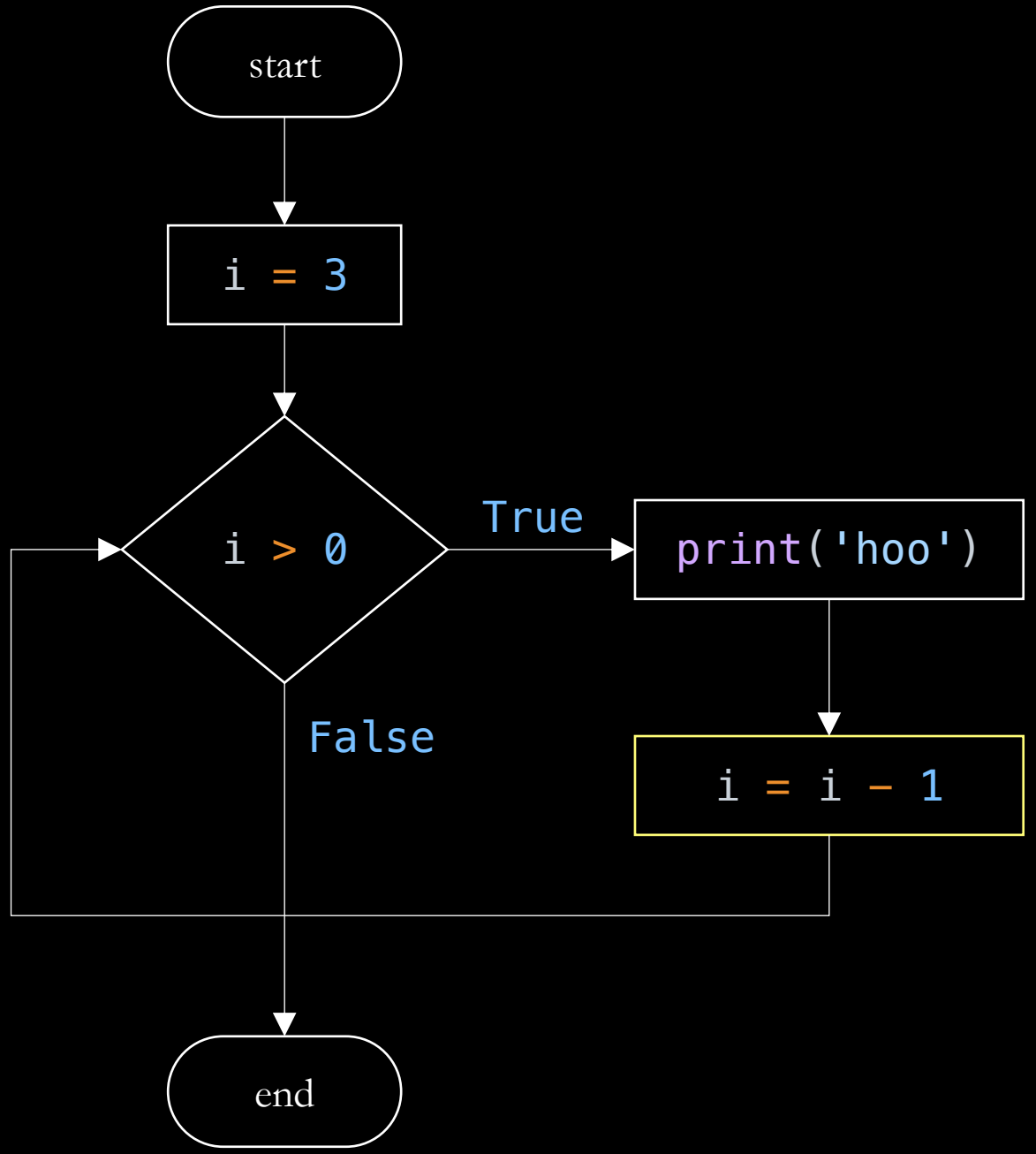
```



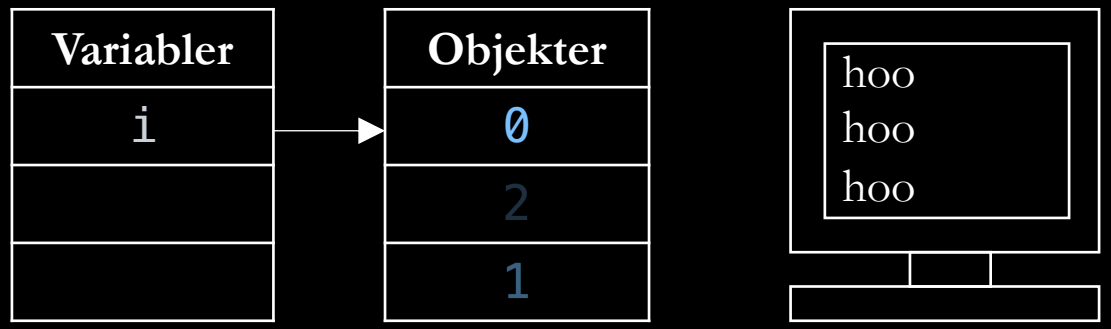


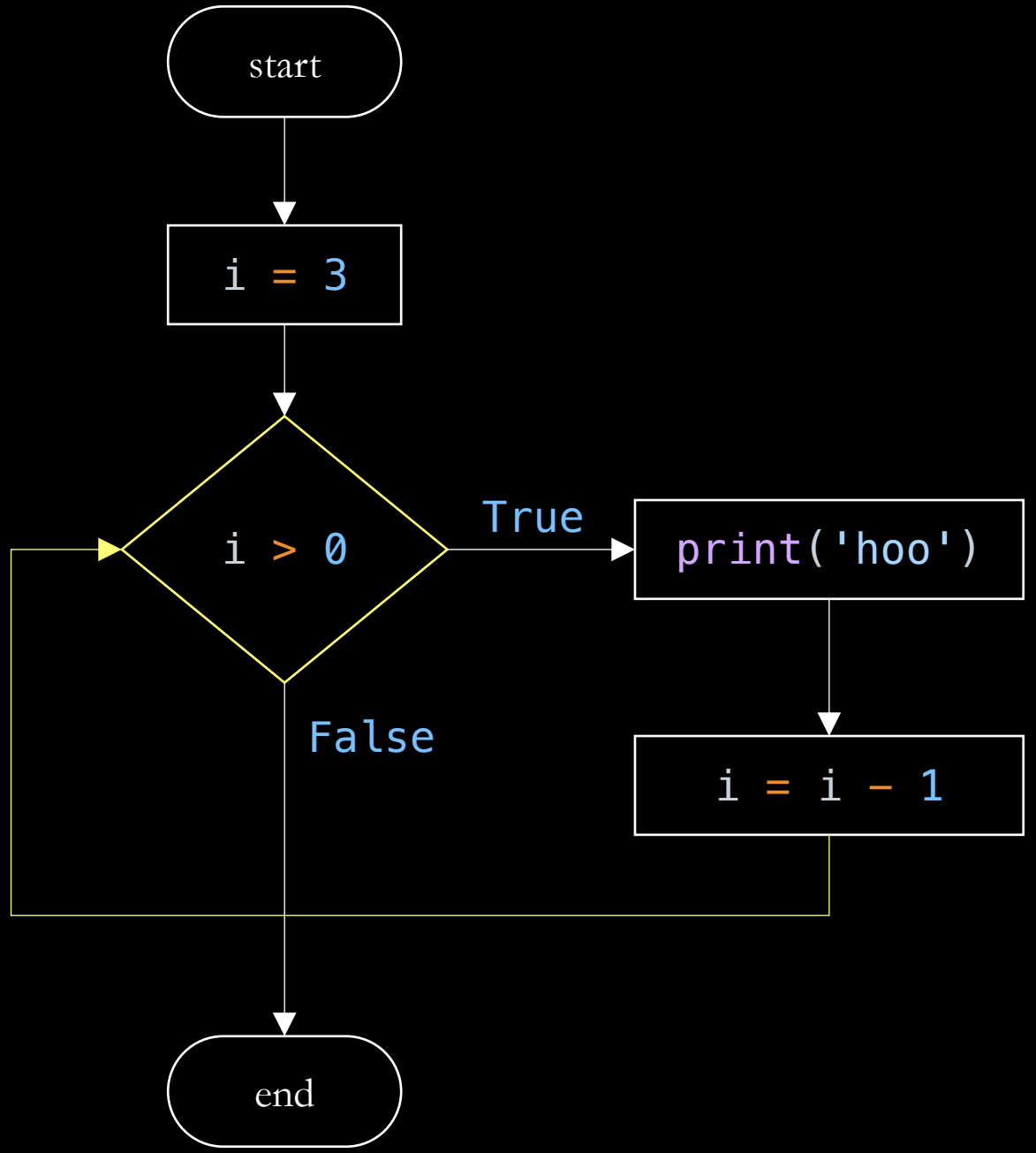
```
i = 3
while i > 0:
    print('hoo')
    i = i - 1
```

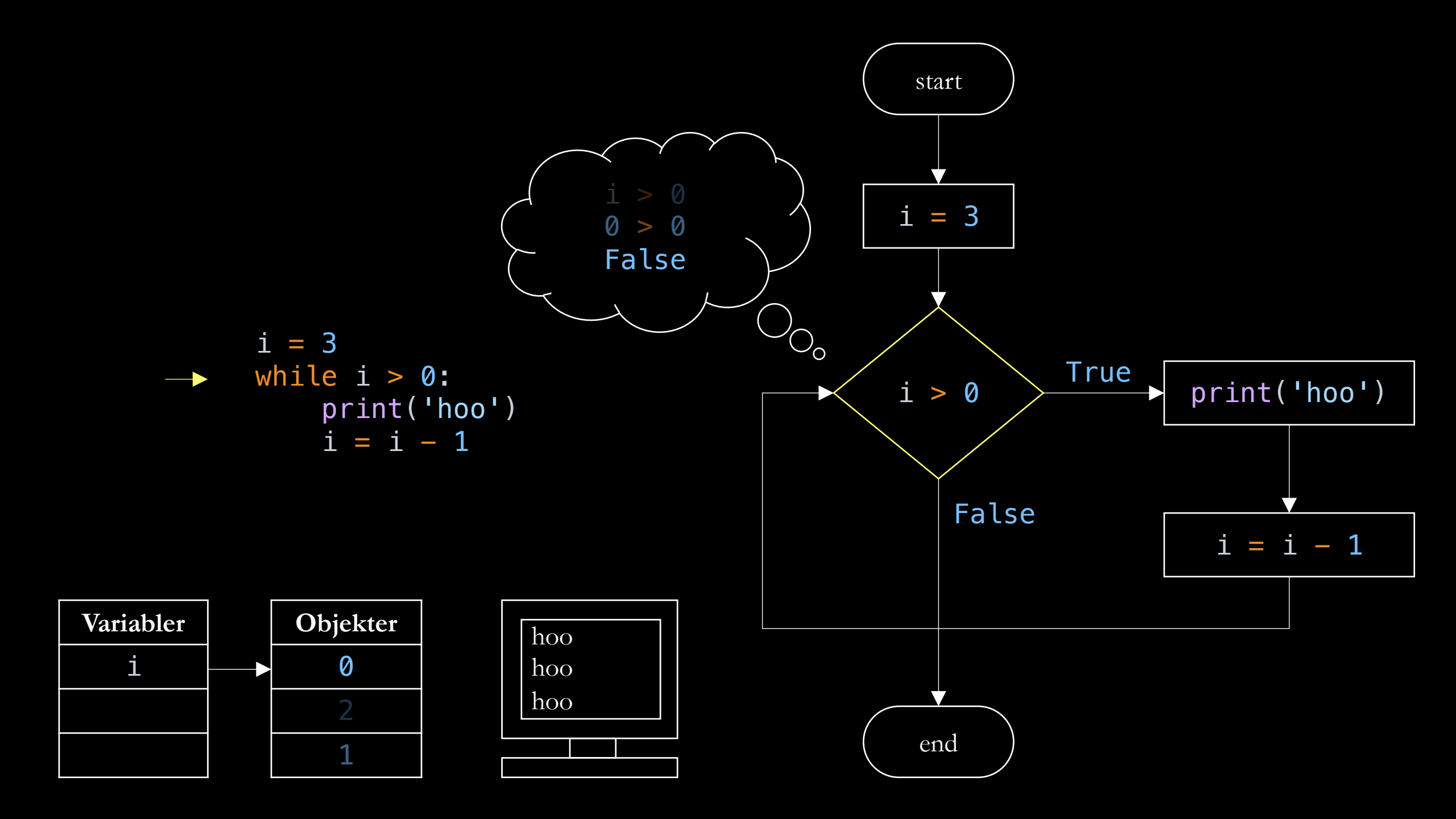


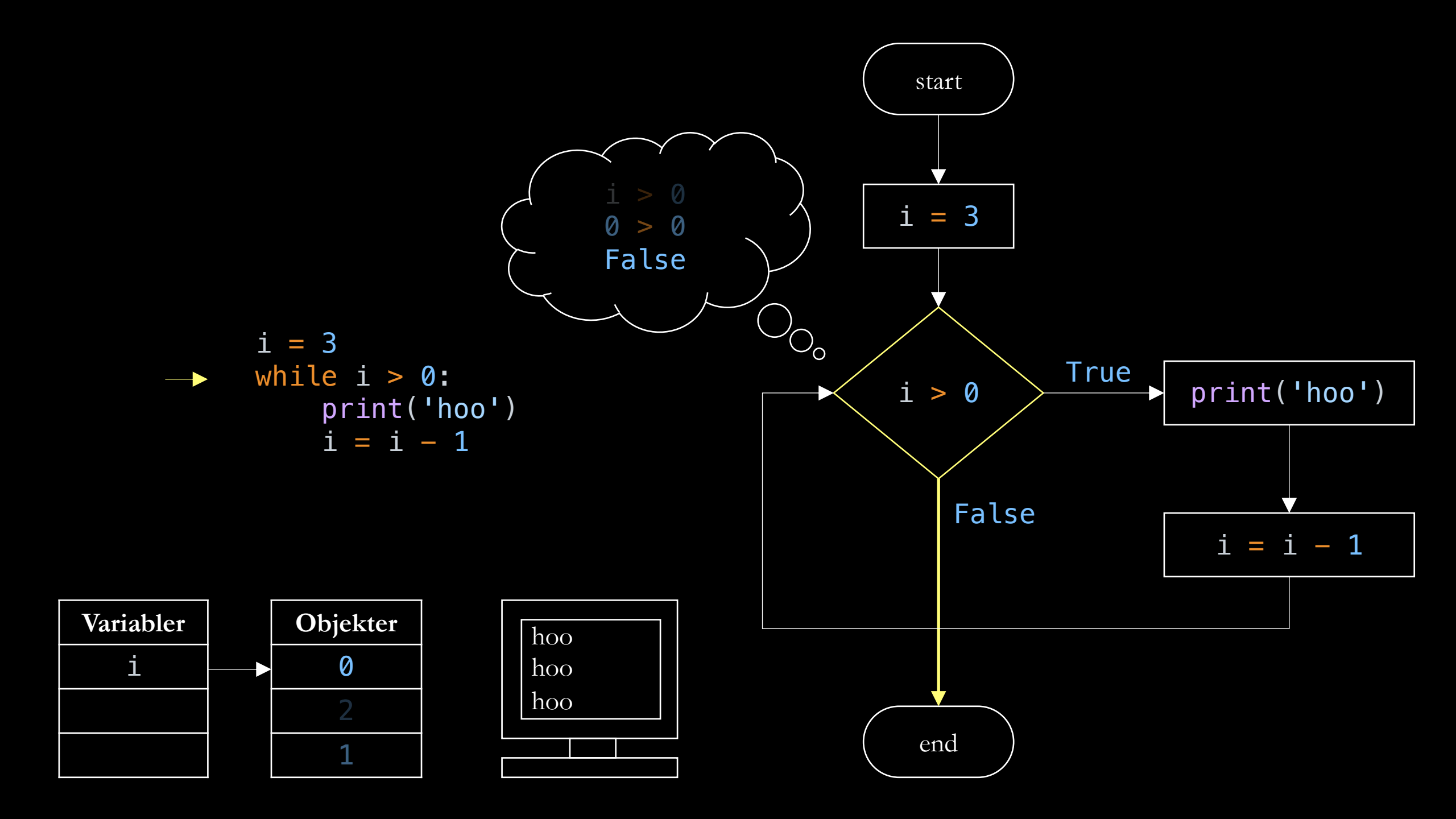


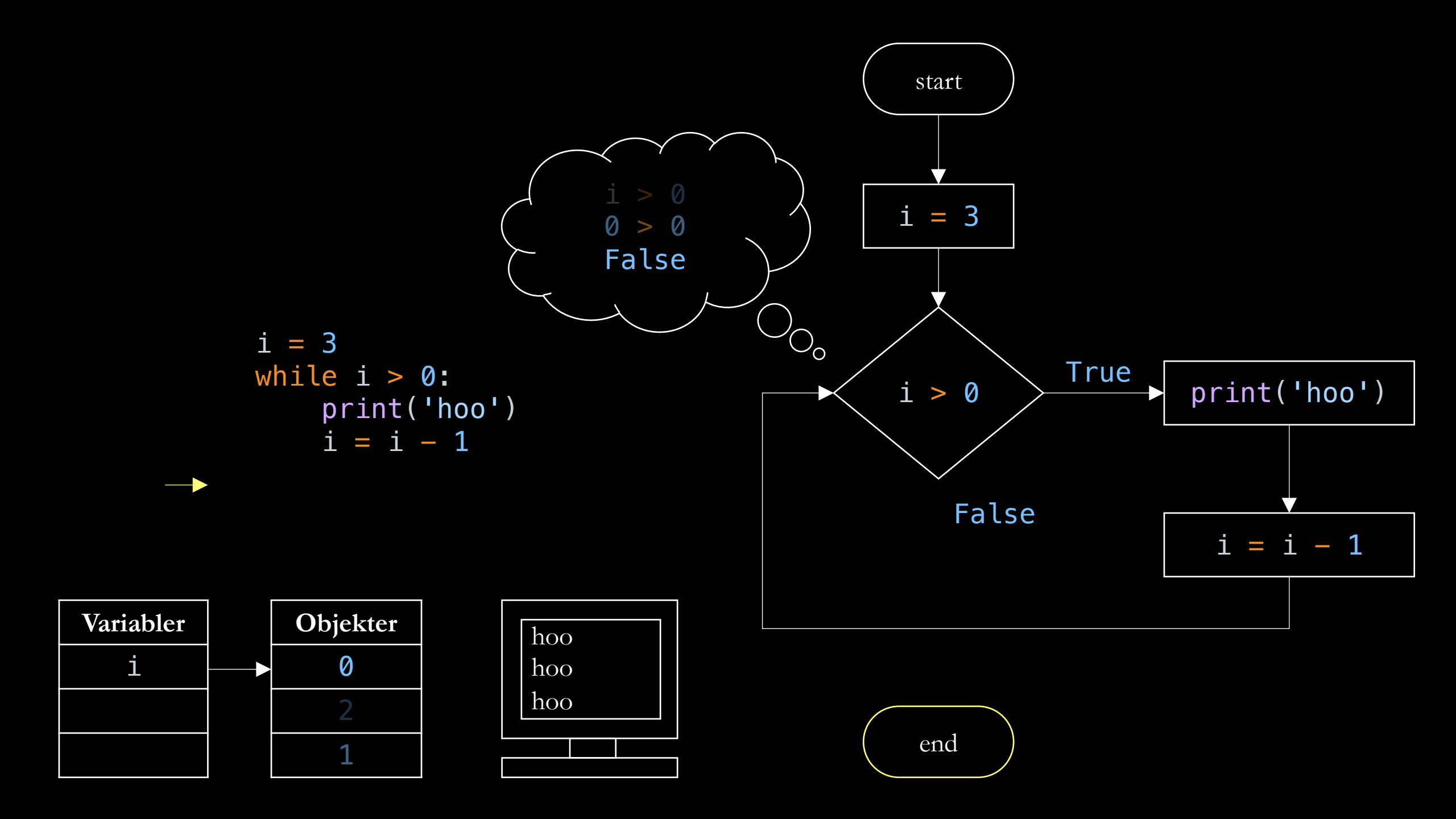
```
i = 3
while i > 0:
    print('hoo')
    i = i - 1
```






start
i = 3
i > 0
True
print('hoo')
i = i - 1
False
end
i > 0
0 > 0
False
i = 3
while i > 0:
print('hoo')
i = i - 1
Variabler
i
Objekter
0
2
1
hoo
hoo
hoo


start
i = 3
i > 0
0 > 0
False
i = 3
while i > 0:
print('hoo')
i = i - 1
i > 0
True
print('hoo')
i = i - 1
False
end
Variabler
i
Objekter
0
2
1
hoo
hoo
hoo


start
i = 3
i > 0
0 > 0
False
i > 0
True
print('hoo')
False
i = i - 1
i = 3
while i > 0:
print('hoo')
i = i - 1
Variabler
i
Objekter
0
2
1
hoo
hoo
hoo
end

```
i = 3
while i > 0:
    print('hoo')
    i = i - 1
```



```
i = 0
while i < 3:
    print('hoo')
    i += 1
```

```
i = 0
while i < 3:
    print('hoo')
    i += 1
```



```
for i in [0, 1, 2]:
    print('hoo')
```

```
for i in [0, 1, 2]:
    print('hoo')
```



```
for i in range(3):
    print('hoo')
```

```
for i in range(3):
    print('hoo')
```



```
for _ in range(3):
    print('hoo')
```

```
range(5)
```

```
0, 1, 2, 3, 4
```

```
range(3, 7)
```

```
3, 4, 5, 6
```

```
range(10, 20, 2)
```

```
10, 12, 14, 16, 18
```

```
range(20, 10, -2)
```

```
20, 18, 16, 14, 12
```

`for`

`while`

kan vare evig ☑

☑ kortere å skrive

☑ mindre bugs

Oppgave:

Les input fra brukeren helt til du får noe du vil ha

`break`

avbryt løkken umiddelbart

`continue`

avbryt denne iterasjon av løkken

JOBBE I FLERE FILER

foo.py

```python
from bar import add

num1 = int(input('num1 = '))
num2 = int(input('num2 = '))

ans = add(num1, num2)
print(f'Added nums: {ans}')
```

```
$ python foo.py
Testing add... OK
Testing multiply... OK
num1 = 2
num2 = 2
Added nums: 4
```

bar.py

```python
def add(a, b):
    return a + b

print('Testing add... ', end='')
assert 4 == add(2, 2)
print('OK')


def multiply(a, b):
    return a * b

print('Testing multiply... ', end='')
assert 6 == multiply(2, 3)
print('OK')
```

IF __NAME__ == "__MAIN__":

foo.py

```
from bar import add

num1 = int(input('num1 = '))
num2 = int(input('num2 = '))

ans = add(num1, num2)
print(f'Added nums: {ans}')
```

```
$ python foo.py
num1 = 2
num2 = 2
Added nums: 4
```

bar.py

```
def add(a, b):
    return a + b

def test_add():
    print('Testing add... ', end='')
    assert 4 == add(2, 2)
    print('OK')

def multiply(a, b):
    return a * b

def test_multiply():
    print('Testing multiply... ', end='')
    assert 6 == multiply(2, 3)
    print('OK')

if __name__ == '__main__':
    test_add()
    test_multiply()
```

EKSEMPEL: BELGISK FLAGG

Oppgave:

Gitt et heltall x, hvor mange 2'ere er det i tallet?

Oppgave:

Hva er største faktor i tallet 209414732?

Oppgave:

Er tallet x et primtall?

Oppgave:

Hva er det n'te primtallet?