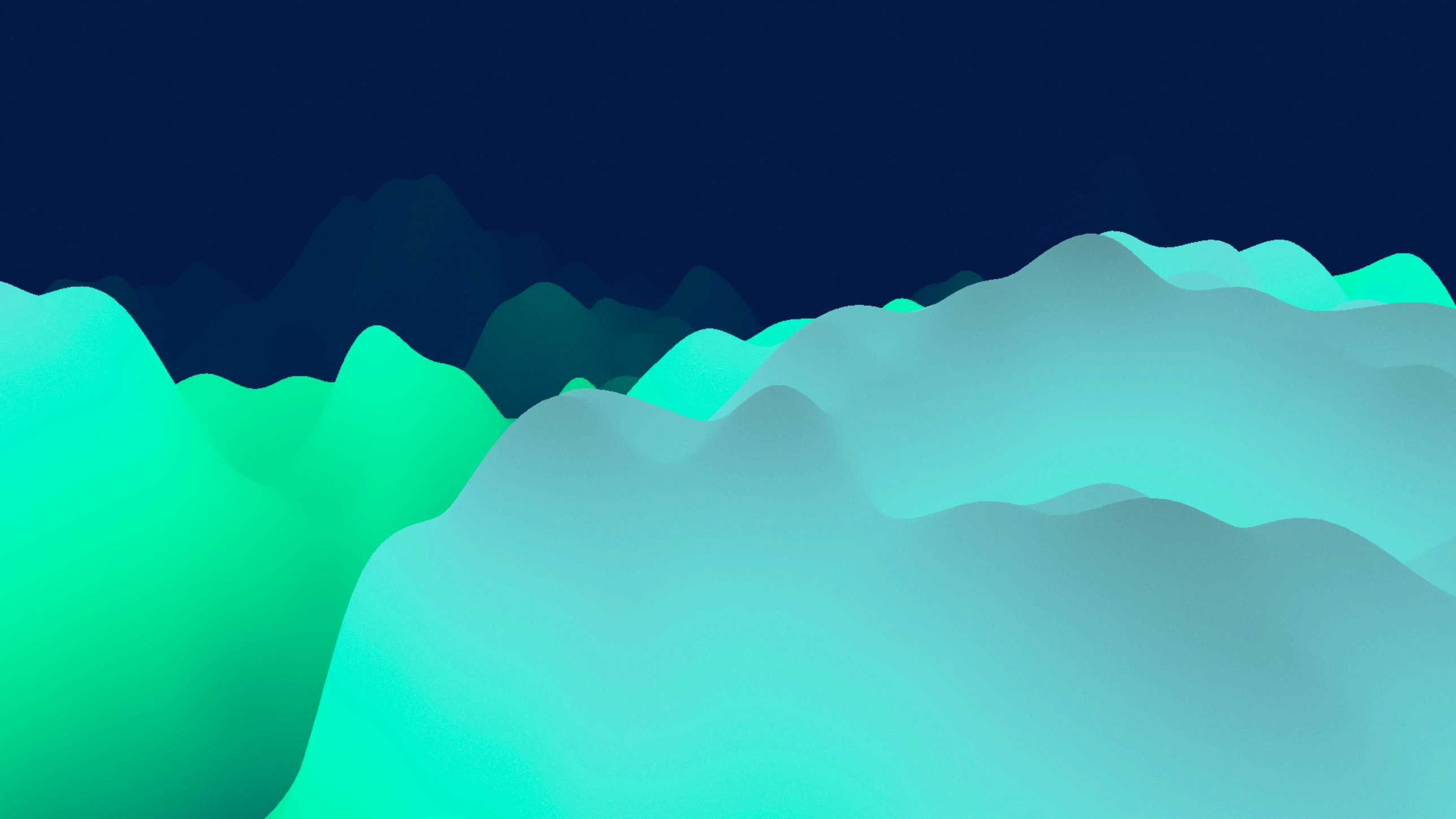
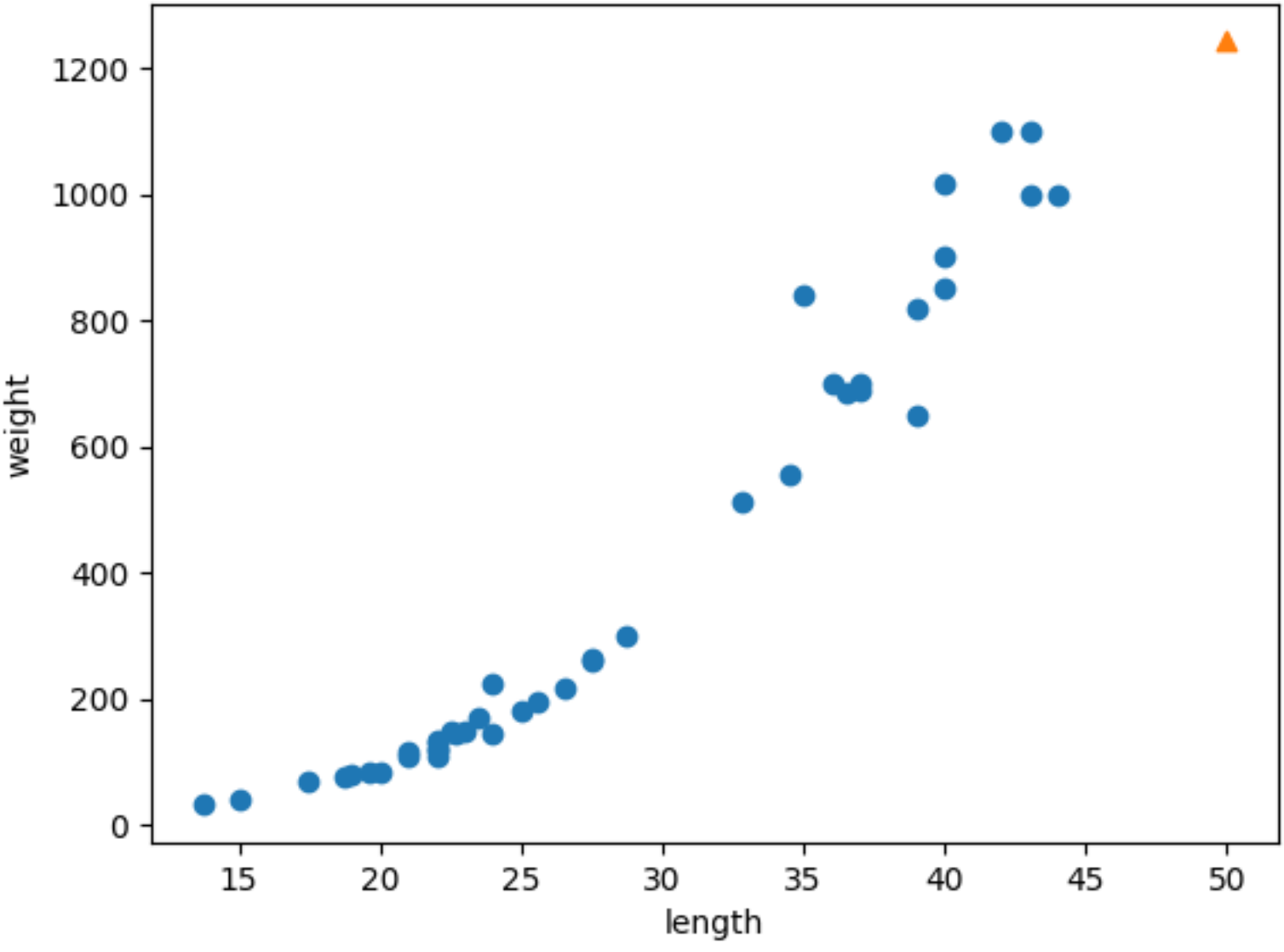
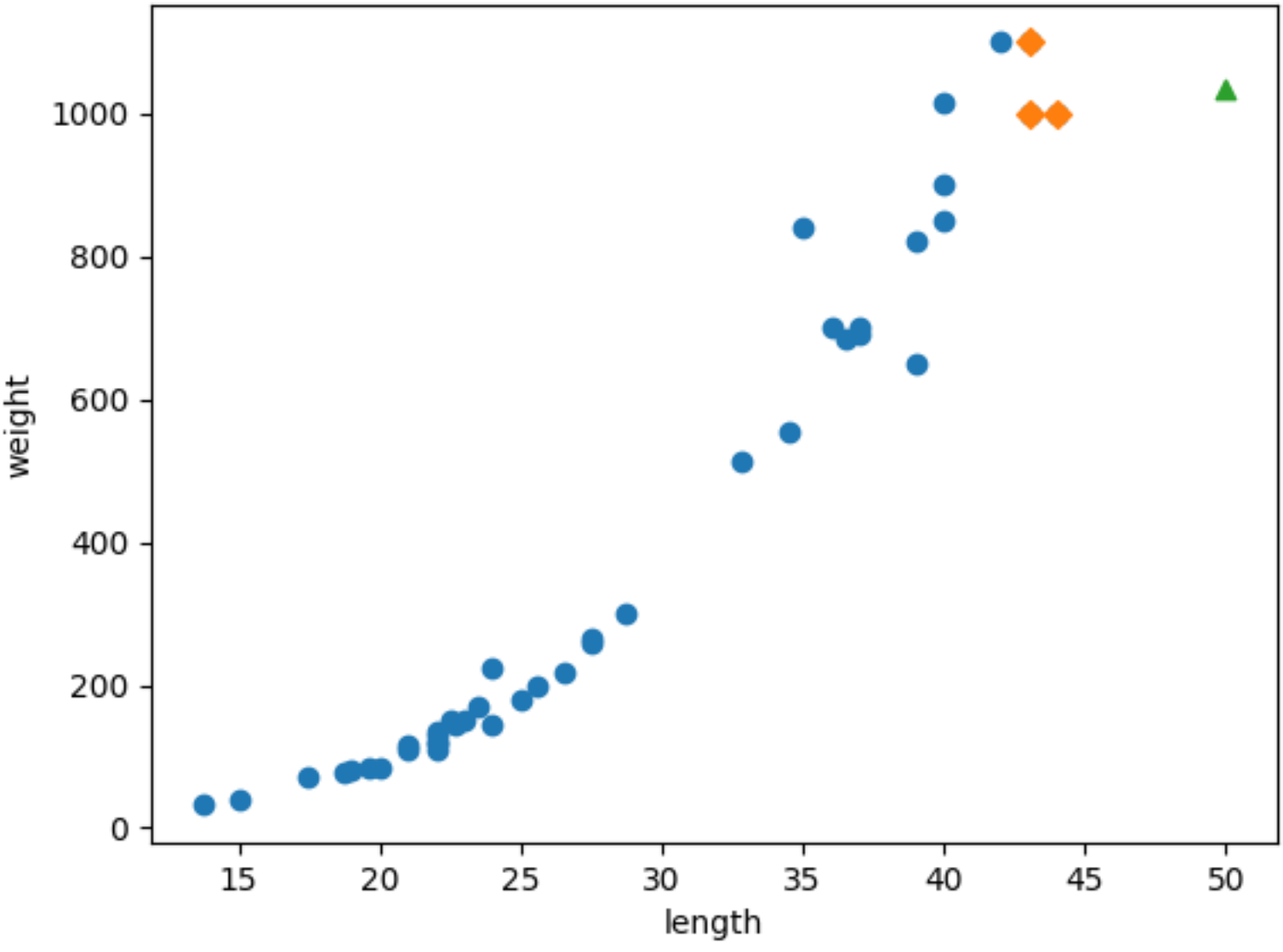
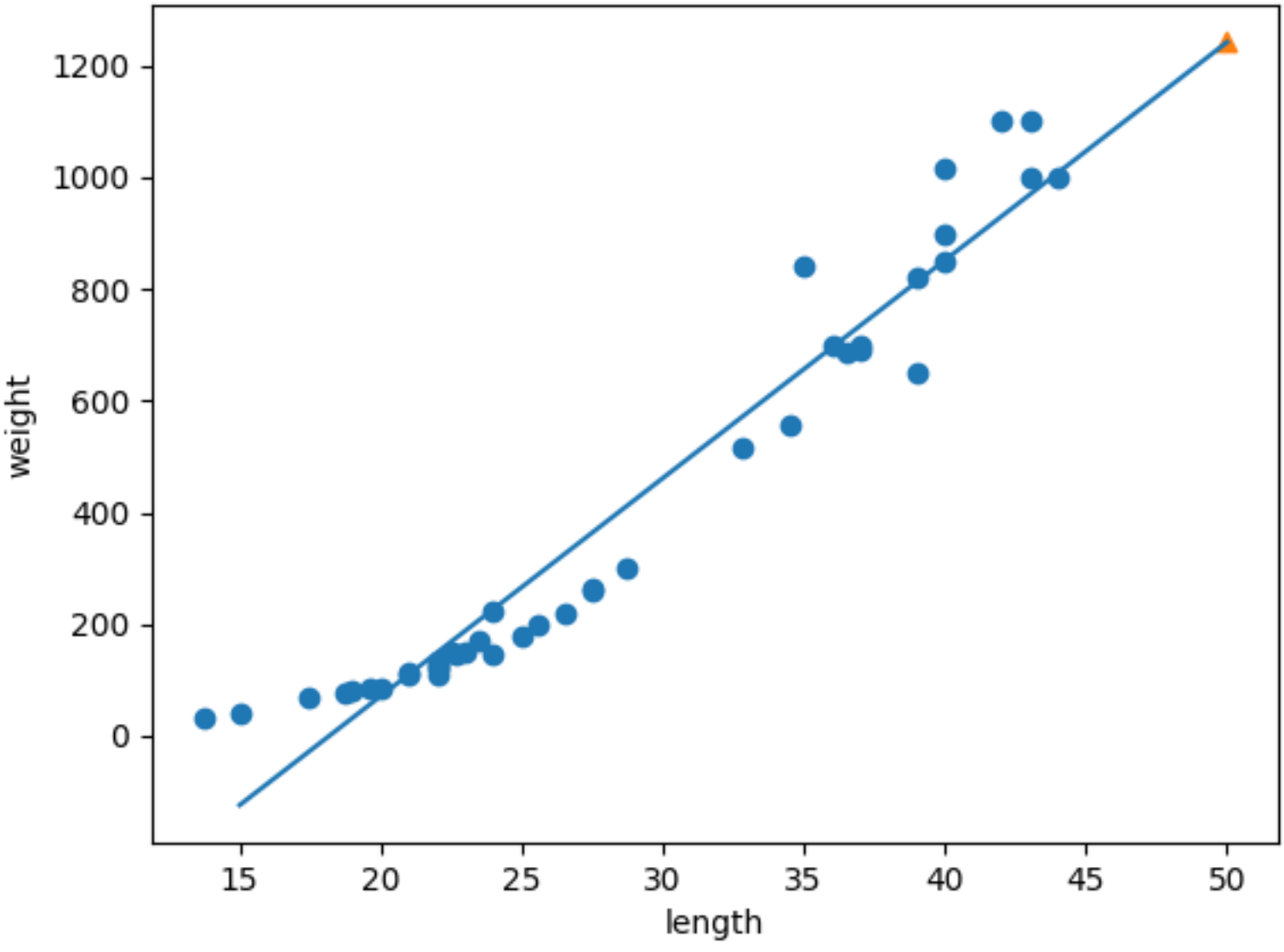


```python
from sklearn.linear_model import LinearRegression
import numpy as np
from sklearn.model_selection import train_test_split
from matplotlib import pyplot as plt

perch_length = np.array([8.4, 13.7, 15.0, 16.2, 17.4, 18.0, 18.7, 19.0, 19.6, 20.0, 21.0,
       21.0, 21.0, 21.3, 22.0, 22.0, 22.0, 22.0, 22.0, 22.5, 22.5, 22.7,
       23.0, 23.5, 24.0, 24.0, 24.6, 25.0, 25.6, 26.5, 27.3, 27.5, 27.5,
       27.5, 28.0, 28.7, 30.0, 32.8, 34.5, 35.0, 36.5, 36.0, 37.0, 37.0,
       39.0, 39.0, 39.0, 40.0, 40.0, 40.0, 40.0, 42.0, 43.0, 43.0, 43.5,
       44.0])
perch_weight = np.array([5.9, 32.0, 40.0, 51.5, 70.0, 100.0, 78.0, 80.0, 85.0, 85.0, 110.0,
       115.0, 125.0, 130.0, 120.0, 120.0, 130.0, 135.0, 110.0, 130.0,
       150.0, 145.0, 150.0, 170.0, 225.0, 145.0, 188.0, 180.0, 197.0,
       218.0, 300.0, 260.0, 265.0, 250.0, 250.0, 300.0, 320.0, 514.0,
       556.0, 840.0, 685.0, 700.0, 700.0, 690.0, 900.0, 650.0, 820.0,
       850.0, 900.0, 1015.0, 820.0, 1100.0, 1000.0, 1100.0, 1000.0,
       1000.0])

train_input, test_input, train_target, test_target = train_test_split(perch_length, perch_weight, random_state=42)

train_input = train_input.reshape(-1, 1)
test_input = test_input.reshape(-1, 1)

lr = LinearRegression()

lr.fit(train_input, train_target)

plt.scatter(train_input, train_target)
# plt.plot([15,50], [15*lr.coef_+lr.intercept_, 50*lr.coef_+lr.intercept_])
plt.scatter(50, 1241.8, marker='^')
plt.xlabel('length')
plt.ylabel('weight')
plt.show()
```


1200
1000
800
600
400
200
0
weight
15
20
25
30
35
40
45
50
length


weight
length
0
200
400
600
800
1000
15
20
25
30
35
40
45
50

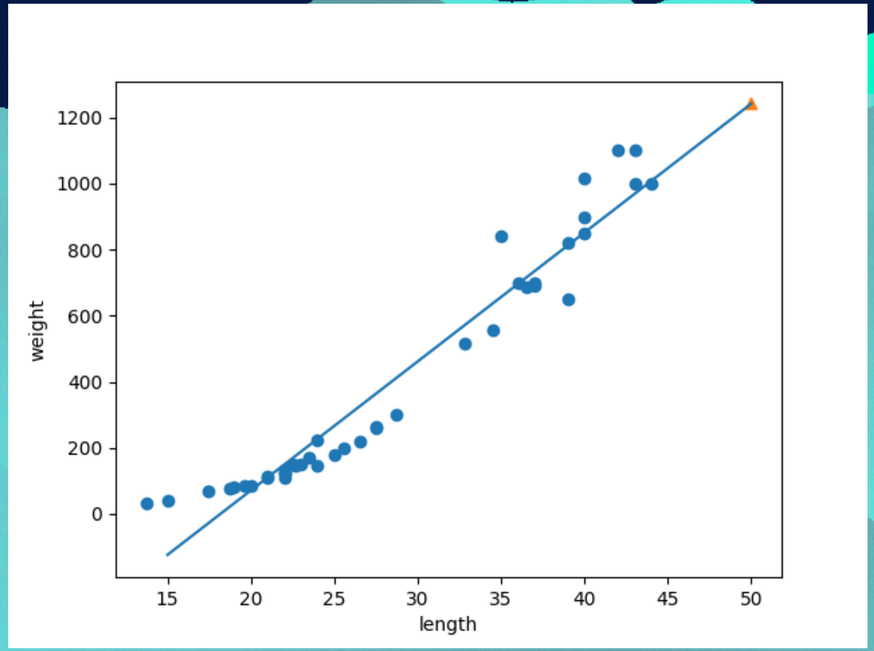
```python
from sklearn.linear_model import LinearRegression
import numpy as np
from sklearn.model_selection import train_test_split
from matplotlib import pyplot as plt

perch_length = np.array([8.4, 13.7, 15.0, 16.2, 17.4, 18.0, 18.7, 19.0, 19.6, 20.0, 21.0,
       21.0, 21.0, 21.3, 22.0, 22.0, 22.0, 22.0, 22.0, 22.5, 22.5, 22.7,
       23.0, 23.5, 24.0, 24.0, 24.6, 25.0, 25.6, 26.5, 27.3, 27.5, 27.5,
       27.5, 28.0, 28.7, 30.0, 32.8, 34.5, 35.0, 36.5, 36.0, 37.0, 37.0,
       39.0, 39.0, 39.0, 40.0, 40.0, 40.0, 40.0, 42.0, 43.0, 43.0, 43.5,
       44.0])
perch_weight = np.array([5.9, 32.0, 40.0, 51.5, 70.0, 100.0, 78.0, 80.0, 85.0, 85.0, 110.0,
       115.0, 125.0, 130.0, 120.0, 120.0, 130.0, 135.0, 110.0, 130.0,
       150.0, 145.0, 150.0, 170.0, 225.0, 145.0, 188.0, 180.0, 197.0,
       218.0, 300.0, 260.0, 265.0, 250.0, 250.0, 300.0, 320.0, 514.0,
       556.0, 840.0, 685.0, 700.0, 700.0, 690.0, 900.0, 650.0, 820.0,
       850.0, 900.0, 1015.0, 820.0, 1100.0, 1000.0, 1100.0, 1000.0,
       1000.0])

train_input, test_input, train_target, test_target = train_test_split(perch_length, perch_weight, random_state=42)

train_input = train_input.reshape(-1, 1)
test_input = test_input.reshape(-1, 1)

lr = LinearRegression()

lr.fit(train_input, train_target)

plt.scatter(train_input, train_target)
plt.plot([15,50], [15*lr.coef_+lr.intercept_, 50*lr.coef_+lr.intercept_])
plt.scatter(50, 1241.8, marker='^')
plt.xlabel('length')
plt.ylabel('weight')
plt.show()
```


1200
1000
800
600
400
200
0
weight
15
20
25
30
35
40
45
50
length

# 알고리즘 구현

## 선형 회귀 알고리즘

```python
from sklearn.linear_model import LinearRegression
import numpy as np
from sklearn.model_selection import train_test_split
from matplotlib import pyplot as plt

perch_length = np.array([8.4, 13.7, 15.0, 16.2, 17.4, 18.0, 18.7, 19.0, 19.6, 20.0, 21.0,
       21.0, 21.0, 21.3, 22.0, 22.0, 22.0, 22.0, 22.0, 22.5, 22.5, 22.7,
       23.0, 23.5, 24.0, 24.0, 24.6, 25.0, 25.6, 26.5, 27.3, 27.5, 27.5,
       27.5, 28.0, 28.7, 30.0, 32.8, 34.5, 35.0, 36.5, 36.0, 37.0, 37.0,
       39.0, 39.0, 39.0, 40.0, 40.0, 40.0, 40.0, 42.0, 43.0, 43.0, 43.5,
       44.0])
perch_weight = np.array([5.9, 32.0, 40.0, 51.5, 70.0, 100.0, 78.0, 80.0, 85.0, 85.0, 110.0,
       115.0, 125.0, 130.0, 120.0, 120.0, 130.0, 135.0, 110.0, 130.0,
       150.0, 145.0, 150.0, 170.0, 225.0, 145.0, 188.0, 180.0, 197.0,
       218.0, 300.0, 260.0, 265.0, 250.0, 250.0, 300.0, 320.0, 514.0,
       556.0, 840.0, 685.0, 700.0, 700.0, 690.0, 900.0, 650.0, 820.0,
       850.0, 900.0, 1015.0, 820.0, 1100.0, 1000.0, 1100.0, 1000.0,
       1000.0])

train_input, test_input, train_target, test_target = train_test_split(perch_length, perch_weight, random_state=42)

train_input = train_input.reshape(-1, 1)
test_input = test_input.reshape(-1, 1)

lr = LinearRegression()

lr.fit(train_input, train_target)

plt.scatter(train_input, train_target)
plt.plot([15,50], [15*lr.coef_+lr.intercept_, 50*lr.coef_+lr.intercept_])
plt.scatter(50, 1241.8, marker='^')
plt.xlabel('length')
plt.ylabel('weight')
plt.show()
```



# 알고리즘 구현

## 다항 회귀 알고리즘

```python
from sklearn.linear_model import LinearRegression
import numpy as np
from sklearn.model_selection import train_test_split
from matplotlib import pyplot as plt

perch_length = np.array([8.4, 13.7, 15.0, 16.2, 17.4, 18.0, 18.7, 19.0, 19.6, 20.0, 21.0,
       21.0, 21.0, 21.3, 22.0, 22.0, 22.0, 22.0, 22.0, 22.5, 22.5, 22.7,
       23.0, 23.5, 24.0, 24.0, 24.6, 25.0, 25.6, 26.5, 27.3, 27.5, 27.5,
       27.5, 28.0, 28.7, 30.0, 32.8, 34.5, 35.0, 36.5, 36.0, 37.0, 37.0,
       39.0, 39.0, 39.0, 40.0, 40.0, 40.0, 40.0, 42.0, 43.0, 43.0, 43.5,
       44.0])
perch_weight = np.array([5.9, 32.0, 40.0, 51.5, 70.0, 100.0, 78.0, 80.0, 85.0, 85.0, 110.0,
       115.0, 125.0, 130.0, 120.0, 120.0, 130.0, 135.0, 110.0, 130.0,
       150.0, 145.0, 150.0, 170.0, 225.0, 145.0, 188.0, 180.0, 197.0,
       218.0, 300.0, 260.0, 265.0, 250.0, 250.0, 300.0, 320.0, 514.0,
       556.0, 840.0, 685.0, 700.0, 700.0, 690.0, 900.0, 650.0, 820.0,
       850.0, 900.0, 1015.0, 820.0, 1100.0, 1000.0, 1100.0, 1000.0,
       1000.0])

train_input, test_input, train_target, test_target = train_test_split(perch_length, perch_weight, random_state=42)

train_input = train_input.reshape(-1, 1)
test_input = test_input.reshape(-1, 1)

train_poly = np.column_stack((train_input**2, train_input))
test_poly = np.column_stack((test_input**2, test_input))

lr = LinearRegression()
lr.fit(train_poly, train_target)

# point = np.arange(15, 50)
plt.scatter(train_input, train_target)
# plt.plot(point, lr.coef_[0]*point**2+lr.coef_[1]*point+lr.intercept_)
plt.scatter(50, 1574, marker='^')
plt.xlabel('length')
plt.ylabel('weight')
plt.show()
```