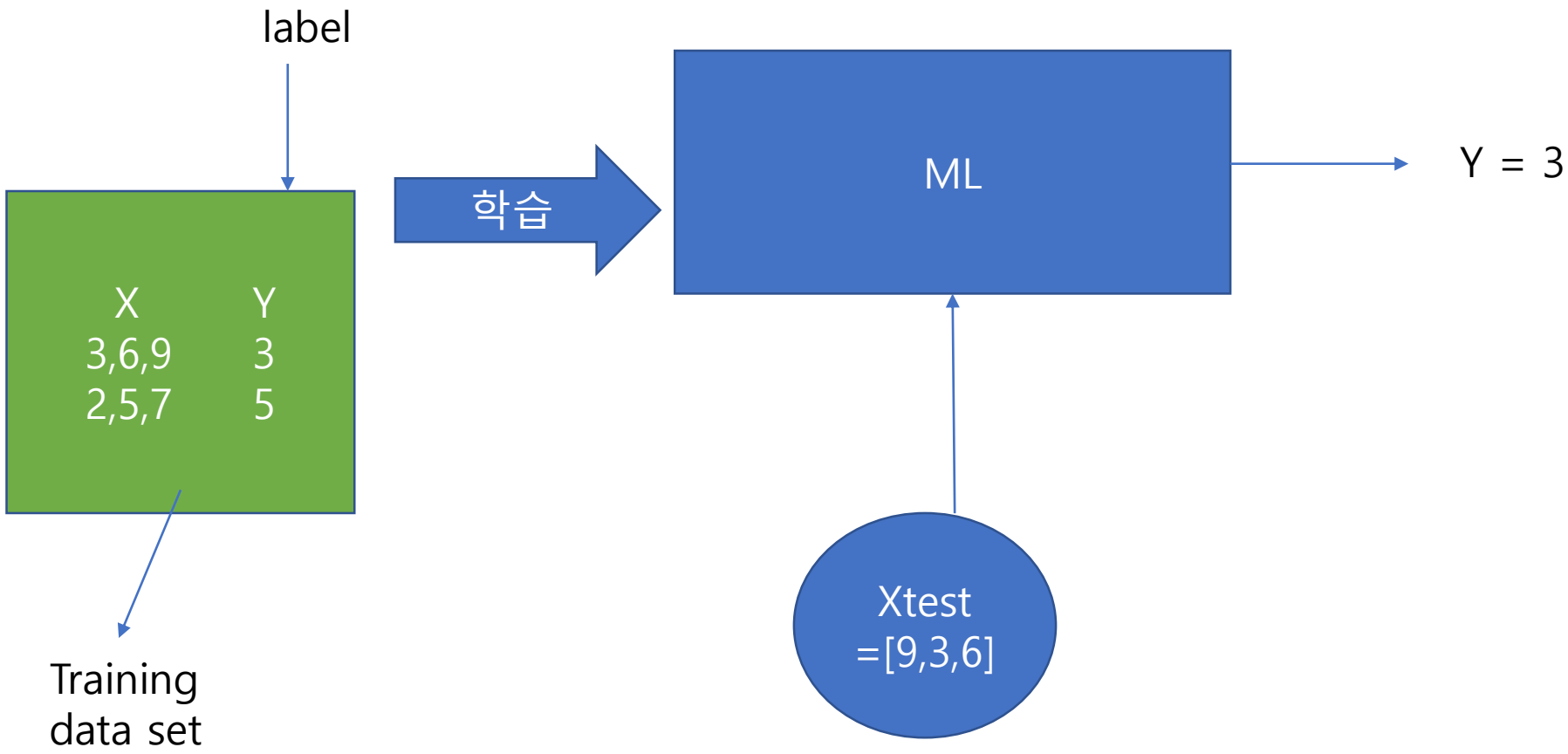
머신러닝

- Field of study that gives computers the ability to learn without being explicitly programmed
- 개발자가 일일이 어떻게 하는지 정하지 않고 프로그램 자체가 어떤 데이터를 보고 학습해서 배우는 능력을 가짐

학습

- Supervised learning
  - Learning with labeled examples(=training set)
  - Image labeling : learning from tagged images
  - Email spam filter : learning from labeled (spam or ham) email
  - Predicting exam score : learning from previous exam score and time spent
- Unsupervised learning
  - Un-labeled data
  - 데이터를 보고 스스로 학습한다.

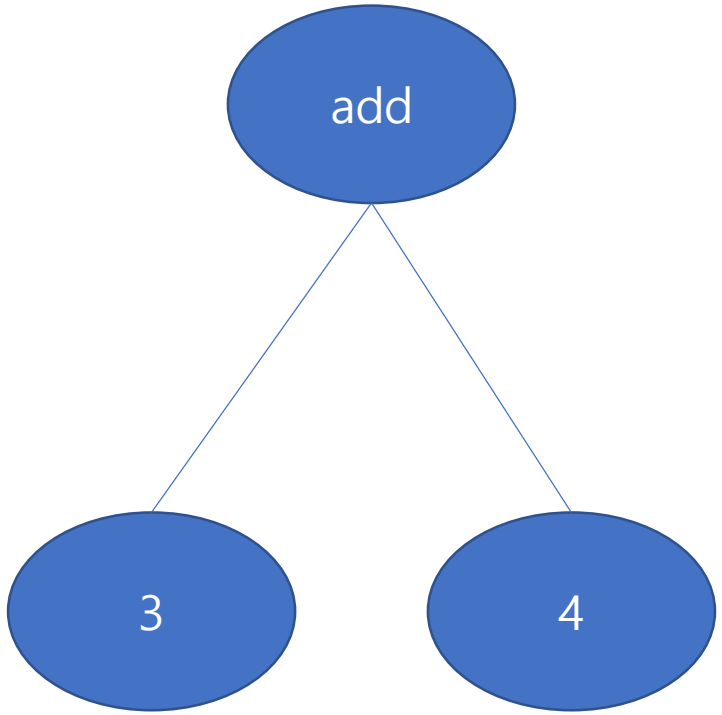
Training data set



Types of supervised learning

- Predicting final exam score based on time spend
  - 0~100 까지의 범위
  - Regression
- Pass/non-pass based on time spent
  - 둘 중 하나를 고름
  - Binary classification
- Letter grade(A,B,C,E,F) based on time spent
  - 여러 개 중 하나를 고름
  - Multi-label classification

Tensorflow 설치 및 기본 operation



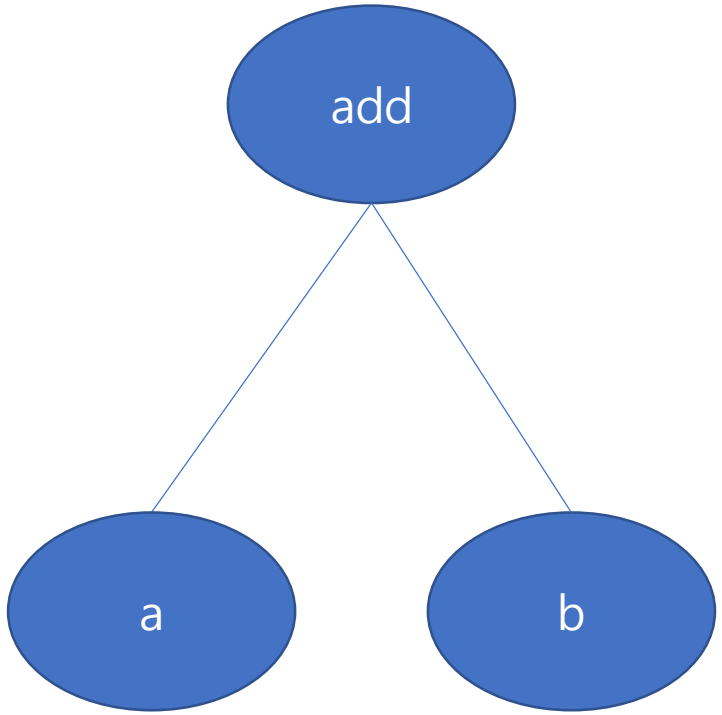

```python
# 1. build graph
node1 = tf.constant(3.0, tf.float32)
node2 = tf.constant(4.0)
node3 = tf.add(node1, node2)

# 2. run session
sess = tf.Session()

# 3. update or return values
print("sess.run(node1, node2) : ", sess.run([node1, node2]))
print("sess.run(node3)", sess.run(node3))
```

```
sess.run(node1, node2) :  [3.0, 4.0]
sess.run(node3) 7.0
```

Placeholder




```
a = tf.placeholder(tf.float32)
b = tf.placeholder(tf.float32)
adder_node = a + b

print(sess.run(adder_node, feed_dict = {a:3, b:4.5}))
print(sess.run(adder_node, feed_dict = {a: [1,3], b :[2,4]}))
```

```
7.5
[3. 7.]
```