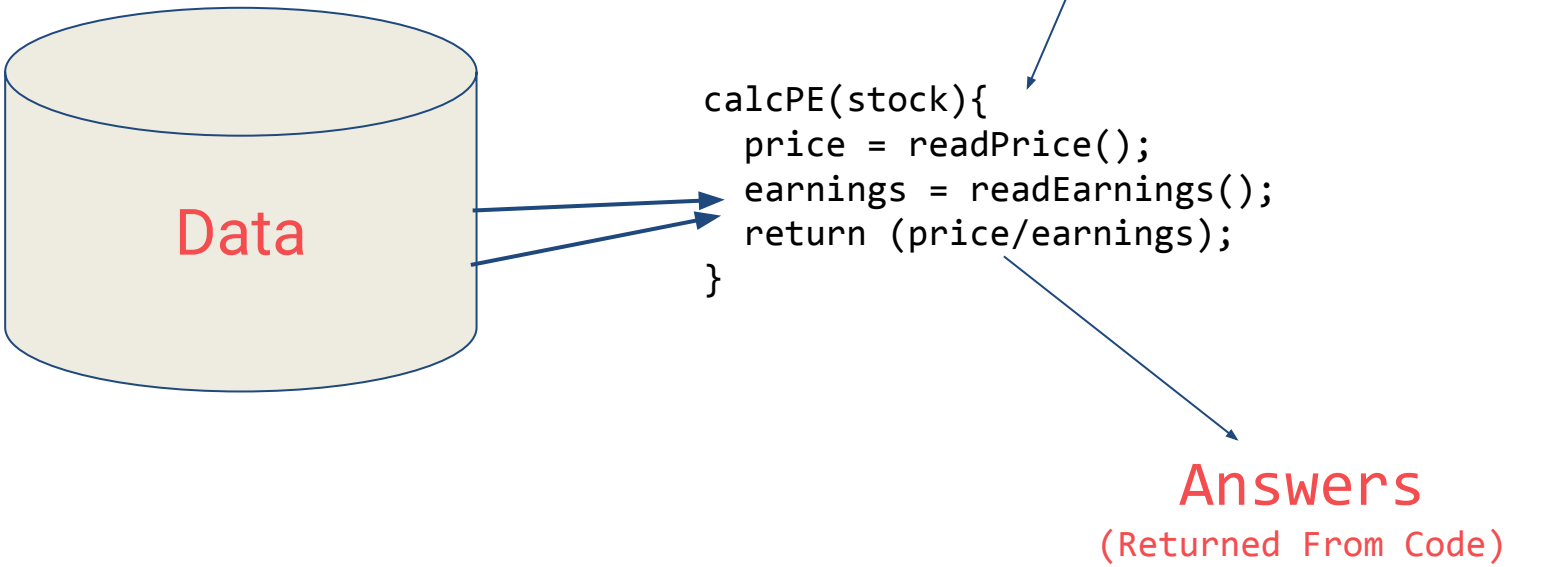
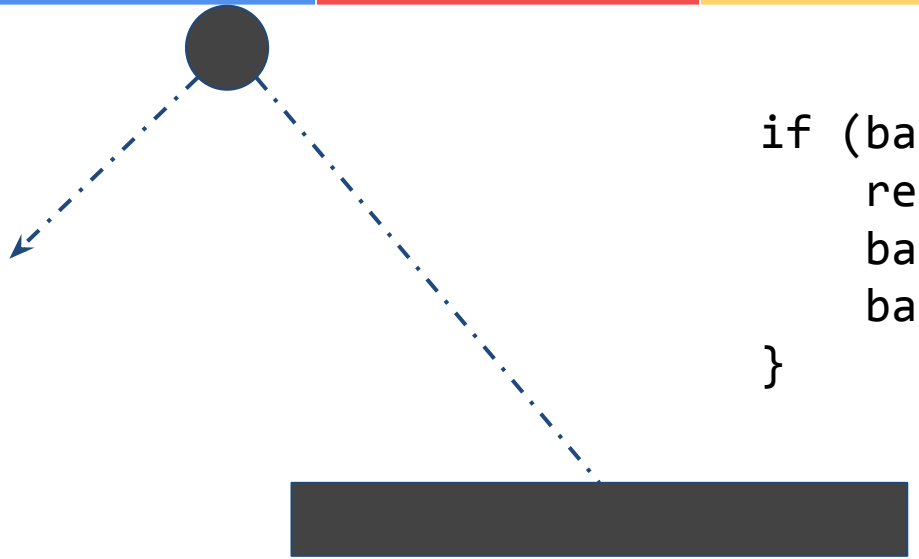
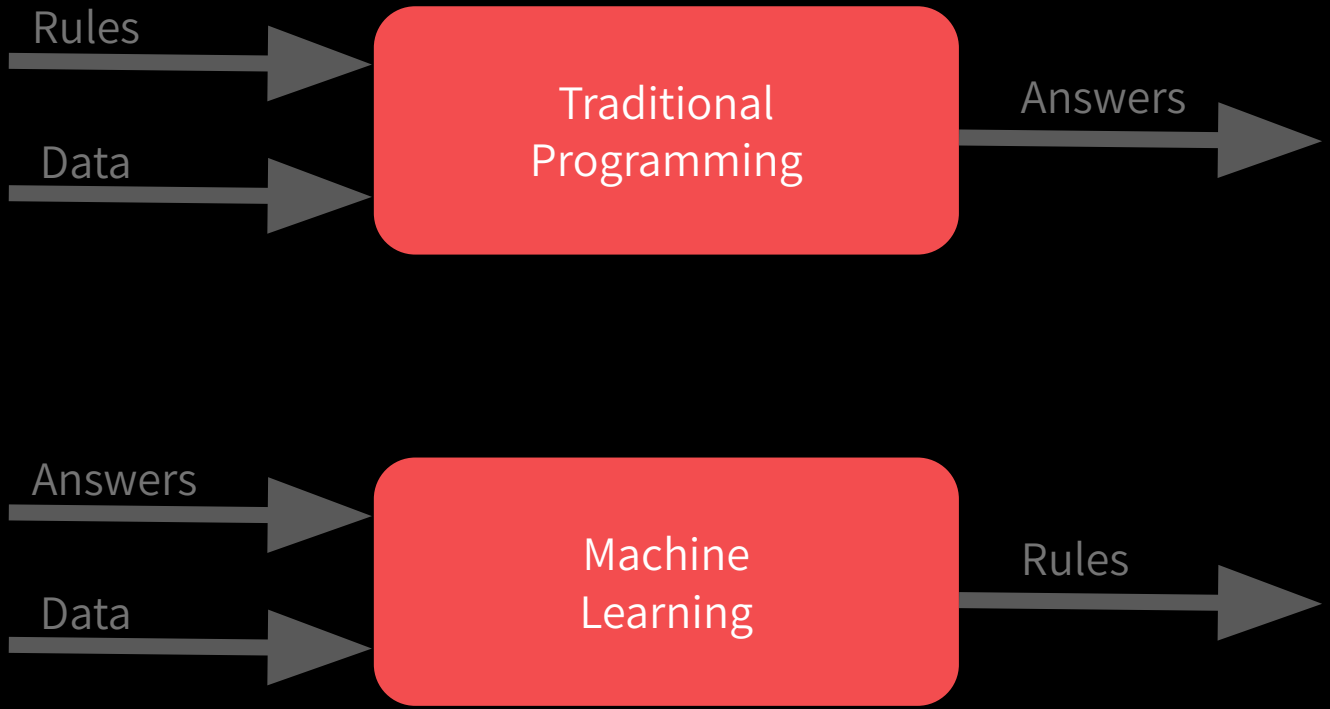

Rules
(Expressed in Code)
Data
calcPE(stock){
price = readPrice();
earnings = readEarnings();
return (price/earnings);
}
Answers
(Returned From Code)



```
if (ball.collide(brick)){
    removeBrick();
    ball.dx=-1*(ball.dx);
    ball.dy=-1*(ball.dy);
}
```


Rules
Data
Traditional Programming
Answers


Rules
Data
Traditional Programming
Answers
Answers
Data
Machine Learning
Rules

Activity Recognition

```
if(speed<4){
    status=WALKING;
}
```

Activity Recognition

```
if(speed<4){
    status=WALKING;
}
```

```
if(speed<4){
    status=WALKING;
} else {
    status=RUNNING;
}
```

Activity Recognition

```
if(speed<4){
    status=WALKING;
}
```

```
if(speed<4){
    status=WALKING;
} else {
    status=RUNNING;
}
```

```
if(speed<4){
    status=WALKING;
} else if(speed<12){
    status=RUNNING;
} else {
    status=BIKING;
}
```

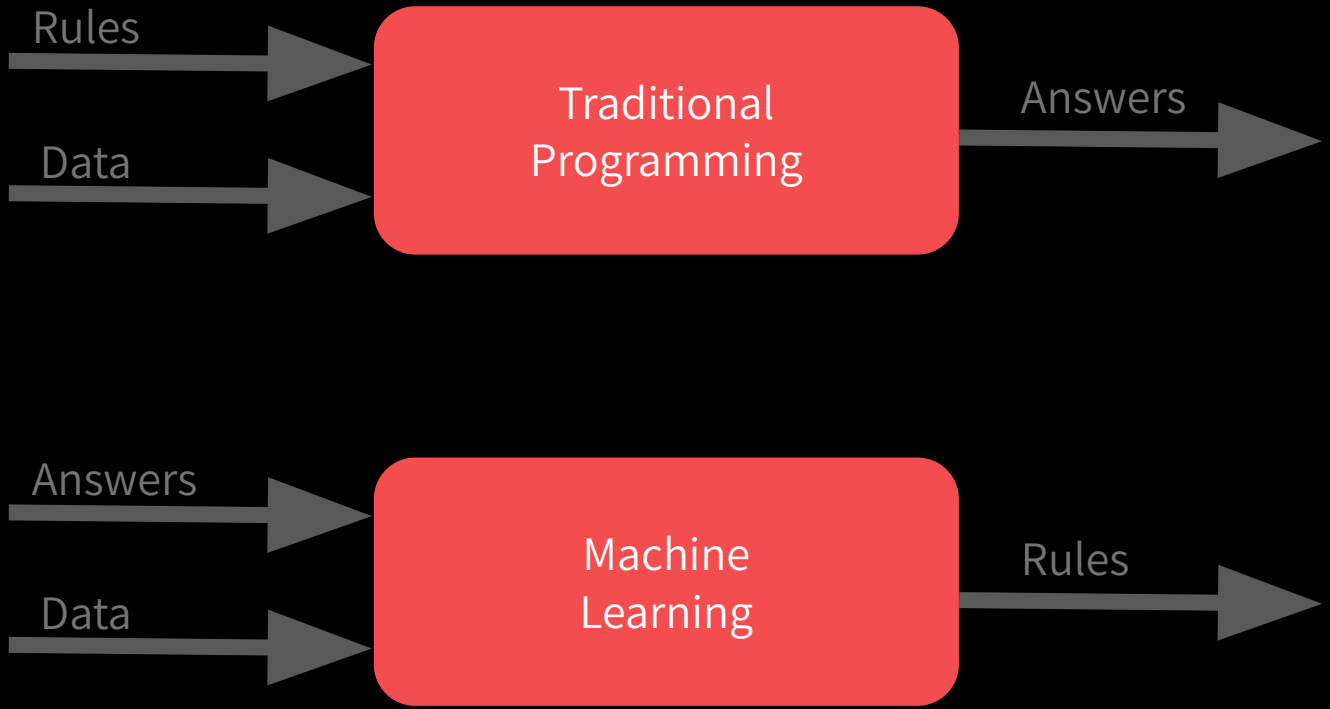
Activity Recognition

```
if(speed<4){
    status=WALKING;
}
```

```
if(speed<4){
    status=WALKING;
} else {
    status=RUNNING;
}
```

```
if(speed<4){
    status=WALKING;
} else if(speed<12){
    status=RUNNING;
} else {
    status=BIKING;
}
```

```
// Oh crap
```


Rules
Data
Traditional Programming
Answers
Answers
Data
Machine Learning
Rules

Activity Recognition

```
0101001010100101010
1001010101001011101
0100101010010101001
0101001010100101010
```

Label = WALKING

```
1010100101001010101
0101010010010010001
0010011111010101111
1010100100111101011
```

Label = RUNNING

```
1001010011111010101
1101010111010101110
1010101111010101011
1111110001111010101
```

Label = BIKING

```
1111111111010011101
0011111010111110101
0101110101010101110
1010101010100111110
```

Label = GOLFING
(Sort of)

```
X = -1,  0, 1, 2, 3, 4
Y = -3, -1, 1, 3, 5, 7
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
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```

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model = tf.keras.Sequential([
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model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
model.compile(optimizer='sgd', loss='mean_squared_error')
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
model.compile(optimizer='sgd', loss='mean_squared_error')

xs = np.array([-1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([-3.0, -1.0, 1.0, 3.0, 5.0, 7.0], dtype=float)
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
model.compile(optimizer='sgd', loss='mean_squared_error')

xs = np.array([-1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([-3.0, -1.0, 1.0, 3.0, 5.0, 7.0], dtype=float)

model.fit(xs, ys, epochs=500)
```

```
model = tf.keras.Sequential([
    tf.keras.Input(shape=(1,)),
    tf.keras.layers.Dense(units=1)
])
model.compile(optimizer='sgd', loss='mean_squared_error')

xs = np.array([-1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([-3.0, -1.0, 1.0, 3.0, 5.0, 7.0], dtype=float)

model.fit(xs, ys, epochs=500)

model.predict(np.array([10.0]))
```