과제 #1

키(x)에 따른 몸무게(y) 데이터를 바탕으로 선형회귀 모델

2015111576 최유진

키와 몸무게 데이터 21개 입력
(여성의 키에 따른 표준 몸무게 데이터 사용)

남자 여자 평균체중

여성				신장	남성			
비만	과체중	표준	저체중		저체중	표준	과체중	비만
51.0	46.8	42.5	36.1	150 cm	38.3	45.0	49.5	54.0
52.0	47.7	43.4	36.8	151 cm	39.0	45.9	50.5	55.1
53.0	48.6	44.2	37.6	152 cm	39.8	46.8	51.5	56.2
54.1	49.6	45.1	38.3	153 cm	40.5	47.7	52.5	57.2
55.1	50.5	45.9	39.0	154 cm	41.3	48.6	53.5	58.3
56.1	51.4	46.8	39.7	155 cm	42.1	49.5	54.5	59.4
57.1	52.4	47.6	40.5	156 cm	42.8	50.4	55.4	60.5
58.1	53.3	48.5	41.2	157 cm	43.6	51.3	56.4	61.6
59.2	54.2	49.3	41.9	158 cm	44.4	52.2	57.4	62.6
60.2	55.2	50.2	42.6	159 cm	45.1	53.1	58.4	63.7
61.2	56.1	51.0	43.4	160 cm	45.9	54.0	59.4	64.8
62.2	57.0	51.9	44.1	161 cm	46.7	54.9	60.4	65.9
63.2	58.0	52.7	44.8	162 cm	47.4	55.8	61.4	67.0
64.3	58.9	53.6	45.5	163 cm	48.2	56.7	62.4	68.0
65.3	59.8	54.4	46.2	164 cm	49.0	57.6	63.4	69.1
66.3	60.8	55.3	47.0	165 cm	49.7	58.5	64.4	70.2
67.3	61.7	56.1	47.7	166 cm	50.5	59.4	65.3	71.3
68.3	62.6	57.0	48.4	167 cm	51.3	60.3	66.3	72.4
69.4	63.6	57.8	49.1	168 cm	52.0	61.2	67.3	73.4
70.4	64.5	58.7	49.9	169 cm	52.8	62.1	68.3	74.5
71.4	65.5	59.5	50.6	170 cm	53.6	63.0	69.3	75.6
72.4	66.4	60.4	51.3	171 cm	54.3	63.9	70.3	76.7
73.4	67.3	61.2	52.0	172 cm	55.1	64.8	71.3	77.8
74.5	68.3	62.1	52.7	173 cm	55.8	65.7	72.3	78.8
75.5	69.2	62.9	53.5	174 cm	56.6	66.6	73.3	79.9
76.5	70.1	63.8	54.2	175 cm	57.4	67.5	74.3	81.0
77.5	71.1	64.6	54.9	176 cm	58.1	68.4	75.3	82.1
78.5	72.0	65.5	55.6	177 cm	58.9	69.3	76.3	83.2
79.6	72.9	66.3	56.4	178 cm	59.7	70.1	77.2	84.2
80.6	73.9	67.2	57.1	179 cm	60.4	71.1	78.2	85.3
81.6	74.8	68.0	57.8	180 cm	61.2	72.0	79.2	86.4
82.6	75.7	68.9	58.5	181 cm	62.0	72.9	80.2	87.5
83.6	76.7	69.7	59.2	182 cm	62.7	73.8	81.2	88.6
84.7	77.6	70.6	60.0	183 cm	63.5	74.7	82.2	89.6
85.7	78.5	71.4	60.7	184 cm	64.3	75.6	83.2	90.7
86.7	79.5	72.3	61.4	185 cm	65.0	76.5	84.2	91.8
87.7	80.4	73.1	62.1	186 cm	65.8	77.4	85.1	92.9
88.7	81.3	74.0	62.9	187 cm	66.6	78.3	86.1	94.0
89.8	82.3	74.8	63.6	188 cm	67.3	79.2	87.1	95.0
90.8	83.2	75.7	64.3	189 cm	68.1	80.1	88.1	96.1
91.8	84.2	76.5	65.0	190 cm	68.9	81.0	89.1	97.2

- 키 데이터
- x_data = [150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168 ,169,170, 180]
- 몸무게 데이터
- y_data = [42.5, 43.4, 44.2, 45.1, 45.9, 46.8, 47.6, 48.5, 49.3, 50.2, 51.0, 51.9, 52.7, 53.6, 54.4, 55.3, 56.1, 57.0, 57.8, 58.7, 59.5, 68.0]

#1

weight	[-10,10]
bias	[-10,10]
learning rate	0.00003
step range	100

learning rate는

0.1부터 시작하여 차차 줄여 나가다가
0.00003 값에 도달하게 됨

loss가 감소하기는 하나,

17이하로는 감소하지 않음.

```
Tensor("X_27:0", dtype=float32)
Tensor("Y_27:0", dtype=float32)
0 316922.78 [2.2217178] [7.5647945]
1 98232.87 [-0.8070133] [7.5459986]
2 30456.312 [0.8790976] [7.556445]
3 9450.954 [-0.0595693] [7.550612]
4 2940.9556 [0.46299165] [7.5538416]
5 923.36993 [0.17207938] [7.5520263]
6 298.0785 [0.33403188] [7.5530195]
7 104.287865 [0.24387215] [7.552449]
8 44.228065 [0.29406467] [7.552749]
9 25.614277 [0.2661223] [7.5525646]
10 19.845476 [0.2816781] [7.55265]
11 18.057596 [0.2730182] [7.552585]
12 17.503492 [0.27783933] [7.5526037]
13 17.331758 [0.27515548] [7.552576]
14 17.278528 [0.2766497] [7.552574]
15 17.262037 [0.275818] [7.552558]
16 17.25692 [0.2762811] [7.55255]
17 17.25533 [0.2760234] [7.552537]
18 17.25483 [0.27616698] [7.5525265]
19 17.254671 [0.27608716] [7.5525146]
20 17.254625 [0.27613172] [7.5525036]
21 17.254608 [0.276107] [7.552492]
22 17.254602 [0.27612087] [7.552481]
23 17.254593 [0.27611324] [7.5524697]
24 17.25459 [0.2761176] [7.552459]
25 17.254583 [0.2761153] [7.5524473]
26 17.254576 [0.27611667] [7.5524364]
27 17.254578 [0.276116] [7.5524254]
28 17.254572 [0.2761165] [7.5524144]
29 17.254564 [0.27611634] [7.5524035]
30 17.25456 [0.27611652] [7.5523925]
31 17.254559 [0.27611655] [7.5523815]
32 17.254555 [0.2761166] [7.5523705]
33 17.254553 [0.27611667] [7.5523596]
34 17.254549 [0.27611676] [7.5523486]
35 17.254543 [0.27611682] [7.5523376]
36 17.25454 [0.2761169] [7.5523267]
37 17.254536 [0.27611697] [7.5523157]
38 17.25453 [0.27611703] [7.5523047]
39 17.254524 [0.27611712] [7.552294]
40 17.254526 [0.27611715] [7.552283]
41 17.254515 [0.27611724] [7.552272]
```

```
80 17.254358 [0.2761199] [7.551844]
81 17.254353 [0.27611995] [7.551833]
82 17.254347 [0.27612] [7.551822]
83 17.254341 [0.2761201] [7.551811]
84 17.254341 [0.27612016] [7.5518003]
85 17.254337 [0.27612022] [7.5517893]
86 17.254333 [0.2761203] [7.5517783]
87 17.254326 [0.27612036] [7.5517673]
88 17.254326 [0.27612042] [7.5517564]
89 17.254324 [0.27612048] [7.5517454]
90 17.25432 [0.27612057] [7.5517344]
91 17.254314 [0.27612063] [7.5517235]
92 17.254309 [0.2761207] [7.5517125]
93 17.254303 [0.27612078] [7.5517015]
94 17.254301 [0.27612084] [7.5516906]
95 17.254295 [0.2761209] [7.5516796]
96 17.254292 [0.276121] [7.5516686]
97 17.25429 [0.27612102] [7.5516577]
98 17.254286 [0.2761211] [7.5516467]
99 17.254278 [0.27612117] [7.5516357]

=== Test ===
X: 180, Y: [57.253445]
X: 150, Y: [48.96981]
```

#2

weight	[-10,10]
bias	[-100,100]
learning rate	0.00003
step range	100

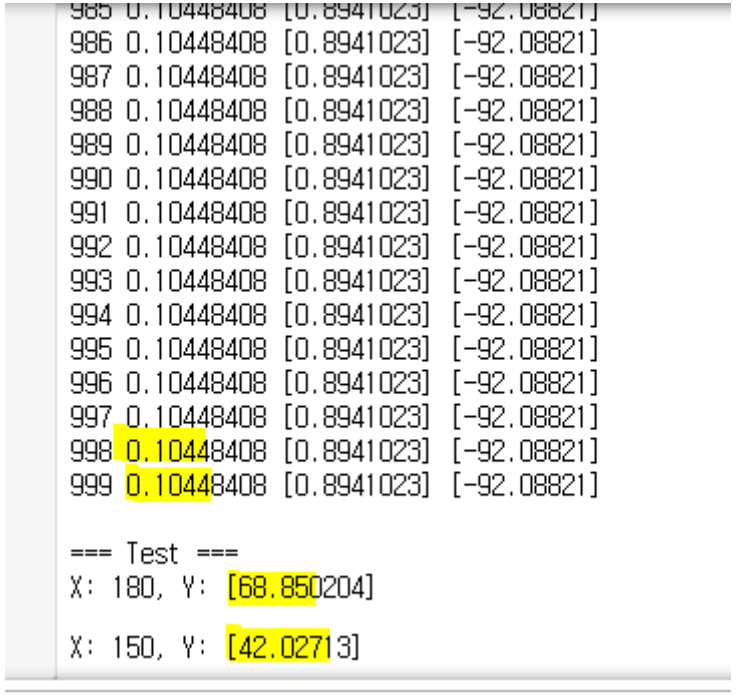
- bias의 변화를 주어 loss를 더 줄일 수 있었음.

```
Tensor("X_28:0", dtype=float32)
Tensor("Y_28:0", dtype=float32)
0 378669.28 [-1.3577495] [-71.932915]
1 117357.73 [1.9529951] [-71.912384]
2 36371.832 [0.10988581] [-71.92382]
3 11272.632 [1.1359549] [-71.91746]
4 3493.86 [0.5647368] [-71.921005]
5 1083.0549 [0.8827369] [-71.91904]
6 335.89685 [0.70570457] [-71.920135]
7 104.33696 [0.8042594] [-71.919525]
8 32.57174 [0.7493934] [-71.91987]
9 10.33025 [0.7799377] [-71.91968]
10 3.4371352 [0.7629335] [-71.919785]
11 1.300788 [0.77239984] [-71.91973]
12 0.63869584 [0.7671299] [-71.91976]
13 0.43349716 [0.7700637] [-71.91975]
14 0.369902 [0.7684305] [-71.91976]
15 0.35019246 [0.76933974] [-71.919754]
16 0.3440854 [0.7688335] [-71.91976]
17 0.34219226 [0.7691154] [-71.91976]
18 0.34160468 [0.76895845] [-71.91976]
19 0.341423 [0.7690458] [-71.91976]
20 0.3413647 [0.7689972] [-71.91976]
21 0.34134853 [0.76902425] [-71.91976]
22 0.34134397 [0.76900923] [-71.91976]
23 0.34134147 [0.7690176] [-71.91976]
24 0.34134164 [0.7690129] [-71.91976]
25 0.3413415 [0.7690155] [-71.91976]
26 0.3413408 [0.76901406] [-71.91976]
27 0.34133998 [0.7690149] [-71.91976]
28 0.34134024 [0.7690144] [-71.91976]
29 0.3413401 [0.76901466] [-71.91976]
30 0.3413411 [0.76901454] [-71.91976]
66 0.34134078 [0.7690146] [-71.91976]
67 0.34134078 [0.7690146] [-71.91976]
68 0.34134078 [0.7690146] [-71.91976]
69 0.34134078 [0.7690146] [-71.91976]
70 0.34134078 [0.7690146] [-71.91976]
71 0.34134078 [0.7690146] [-71.91976]
72 0.34134078 [0.7690146] [-71.91976]
73 0.34134078 [0.7690146] [-71.91976]
74 0.34134078 [0.7690146] [-71.91976]
75 0.34134078 [0.7690146] [-71.91976]
76 0.34134078 [0.7690146] [-71.91976]
77 0.34134078 [0.7690146] [-71.91976]
78 0.34134078 [0.7690146] [-71.91976]
79 0.34134078 [0.7690146] [-71.91976]
80 0.34134078 [0.7690146] [-71.91976]
81 0.34134078 [0.7690146] [-71.91976]
82 0.34134078 [0.7690146] [-71.91976]
83 0.34134078 [0.7690146] [-71.91976]
84 0.34134078 [0.7690146] [-71.91976]
85 0.34134078 [0.7690146] [-71.91976]
86 0.34134078 [0.7690146] [-71.91976]
87 0.34134078 [0.7690146] [-71.91976]
88 0.34134078 [0.7690146] [-71.91976]
89 0.34134078 [0.7690146] [-71.91976]
90 0.34134078 [0.7690146] [-71.91976]
91 0.34134078 [0.7690146] [-71.91976]
92 0.34134078 [0.7690146] [-71.91976]
93 0.34134078 [0.7690146] [-71.91976]
94 0.34134078 [0.7690146] [-71.91976]
95 0.34134078 [0.7690146] [-71.91976]
96 0.34134078 [0.7690146] [-71.91976]
97 0.34134078 [0.7690146] [-71.91976]
98 0.34134078 [0.7690146] [-71.91976]
99 0.34134078 [0.7690146] [-71.91976]

=== Test ===
X: 180, Y: [66.50286]
X: 150, Y: [43.432426]
```

#3

weight	[-10,10]
bias	[-100,100]
learning rate	0.00003
step range	1000



step range를 100 -> 1000으로 증가 시켜 loss를 더욱 줄일 수 있었음.

결과적으로

- 180 – 68.0

에 대하여 예측값 :68.8502

- 150 – 42.5

에 대하여 예측값 : 42.02713

를 도출 할 수 있었음.