Replicate #1 Idea → Prediction 1RM on bench press

Algorithm/Conceptional

Chunk 1 ⇒ Identify the 1RM of bench press

Goal: This is the **formula** the model will be using for predictions

1. log the max weight that I've done for 1RM

2. if not, then use the formula to estimate the 1RM →

$$[est1RM = weight \times (1 + reps/30)]$$

GOAL: is to get a clear estimation of 1RM

Ex: 265lbs * 1rep → 1RM = 265lbs

   225lbs *5rep → 225×(1+5/30) = 263lbs → 1RM = 260-265lbs

Chunk 2 ⇒ Raw Data Collection

Goal: To Build a structured data set for the model to learn from

6 Inputs

1. num of reps

2. weight

3. sets

4. exercise name → bench press, incline smith...

5. exercise type → cable, barbell...

6. date

Date	Exercise Name	Equipment Type	Weight (lbs)	Reps	Sets
2025-10-20	Barbell Bench Press	Barbell	225	5	3
2025-10-20	Incline Dumbbell Press	Dumbbell	75	8	3
2025-10-20	Cable Fly	Cable	50	12	3

Date	Exercise Name	Equipment Type	Weight (lbs)	Reps	Sets
2025-10-13	Barbell Bench Press	Barbell	215	6	3
2025-10-13	Incline Smith Press	Smith Machine	185	8	3
2025-10-06	Barbell Bench Press	Barbell	205	8	3
2025-10-06	Dips	Bodyweight	0	12	3

With those 6 pieces of info, you can later:

- **Find your heaviest barbell set each week** (for your 1RM label).
- **Measure total chest workload** (for predicting future performance).
- **Distinguish between different exercise types** (for feature engineering later)

The model can learn and adapt based on what information am I looking for

Chunk 3 ⇒ Finding weekly max set

Goal: Learning to identify which exercise set to represent my 1RM

1. Group my training into weeks

2. Only keep barbell bench press for simplicity

3. Find the heaviest set → two sets or more will sort by number of reps

4. Find 1RM with sets and reps

$$[est1RM = weight \times (1 + reps/30)]$$

1. Sort it to a new table → only shows the 1RM of the week

Week	Date Range	Top Weight	Reps	est1RM
43	Oct 20–26	225	5	262
42	Oct 13–19	215	6	258
41	Oct 06–12	205	8	257

Chunk 4 ⇒ Logging True 1RMs

Goal: Identify accurate 1RM based on estimation

1. Start with the table from Chunk 3 step 5

2. Make sure every week exists → add N/A if you skipped bench that week to keep timeline continuous

3. Add week number or start date

4. Add Data → True 1RM → only add if the estimation is true (within +- 5lbs)

5. Check for outliers

✅ **End goal of Chunk 4:**

You end up with a small table like this:

Week	Week Start	Top Weight	Reps	est1RM	True Single
41	2025-10-06	205	8	257	0
42	2025-10-13	215	6	258	0
43	2025-10-20	225	5	262	1

*True Single → 0 = Estimation, 1 = I have physically lifted the weight

Chunk 5 ⇒ Feature Extraction

Goal: Tell the model **what to compute** from raw data from Chunk 2

Break Chunk 2 into 4 features

1. Heaviest Weight

2. Max Reps

3. Bodyweight

4. Injuries → e.g: Wristpain

Example from Chunk 2 to Chunk 5:

Raw Data (Chunk 2)

Date	Exercise Name	Equipment Type	Weight (lbs)	Reps	Sets
2025-10-06	Barbell Bench Press	Barbell	205	8	3
2025-10-06	Incline Dumbbell Press	Dumbbell	70	10	3
2025-10-06	Cable Fly	Cable	45	12	3
2025-10-13	Barbell Bench Press	Barbell	215	6	3
2025-10-13	Incline Smith Press	Smith Machine	185	8	3

Date	Exercise Name	Equipment Type	Weight (lbs)	Reps	Sets
2025-10-20	Barbell Bench Press	Barbell	225	5	3
2025-10-20	Dumbbell Fly	Dumbbell	50	10	3

Data Features (Chunk 5)

Week	Max Weight	Max Rep	Bodyweight	Injuries/Pain	Target_1RM
41	205	8	150	0	259
42	215	6	155	0	258
43	225	5	163	1	262

Chunk 6 ⇒ *Learning* to predict 1RM

Summary: You show the model many examples of your past weeks, and it learns the hidden relationship between your training and your true strength.

X-axis → Max weight, Max Rep, Body Weight, Injuries/Pain

Y-axis → Estimated 1RM

Chunk 7 ⇒ Testing The Model

Goal: Check the model is accurate and realistic

1. Test the model that has learned my data from upcoming weeks that **hasn't seen** yet → show true 1RM and predicted 1RM and finally display range of error

Week	True 1RM	Predicted 1RM	Error (Pred - True)
44	265	267	+2
45	270	268	-2
46	272	277	+5

2. Measure Accuracy

$$Error = |\ Predicted - True|$$

error ≤ 5 lb → ✅ counts as correct

$$Accuracy = \frac{Number\ of\ predictions\ within\ \pm 5\ lb\ of\ true\ 1RM}{Total\ number\ of\ predictions} \times 100$$

3. Visual Checks through Graphs

4. Calibration → adjust based on the overall trend

Chunk 8 ⇒ Applying the Model to Predict 1RM

Goal: Use your trained and calibrated model to **estimate your current or next 1 RM**, even if you didn't test a true single this week

1. Collect my latest Inputs

Feature	Example value	Meaning
Max Weight	230	Heaviest barbell weight this week
Max Rep	4	Reps with that weight
Bodyweight	163	Current bodyweight
Pain	1	You had wrist pain this week

2. Feed it into my model → Model takes the nums and apply to chunk 6, 7

Example (made-up output):

> Raw model prediction = 266 lb
>
> After calibration = 264 lb

So your model thinks:

> Your current 1 RM ≈ 264 lb

3. Track and store the data over time

Week	Predicted 1 RM	True 1 RM (if tested)	Bodyweight	Pain
43	262	262	163	1
44	264	—	163	1
45	267	268	164	0

4. Update and Retrain → keep accuracy in tact +- 5lbs