The Modern Lifting Companion Project

Link = http://jarusoa.pythonanywhere.com/the_modern_lifting_companion
Documentation:
What does the Project Do?

The project is served to be a workout companion for the user by asking for the user's one rep maxes and then let them begin their set. They put in what they want to do, the weight in kilos or lbs., and how many reps. From there the user will be the given the RPE of the set of difficulty and will be showed the weight in an easy-to-read table in both weight types so they can go about their work out faster.

Who are the users?
I believe the users are anyone from new lifters to advanced. Even advanced lifters still don't know every conversion to a doubt and must calculate weight a lot. Its also impossible to calculate RPE in your head especially if you're a new lifter. It serves to be an aid to any lifter that needs it.

What Problem Does it Solve?
The problem it solves is a time problem. Usually if you're a new lifter you have no idea what weight looks like on the bar as bar weight is unusual as it need not be evened on both sides but at the same time you must use the biggest plates you can. For advanced lifters the RPE calculation is crucial as most advanced lifters work through RPEs and still advanced lifters especially if they train on competition plates don't know the exact conversion, especially if they are American. It solves the time issue of what weight = what and the difficulty of the weight set for a given athlete.

Hardware and Visual Implications
I will be using python for the calculations of everything and HTML and CSS for displaying the information and getting the information from the user.

Data:

Data Structure and Manipulation:
The data itself travels from a form into a result page that has Python that takes that data and manipulates it in many ways. It takes the users lift maxes and stores them into their own variables. If they pick kilos and input as kilos, it converts it to lbs. accurately by rounding the kilos to the nearest 0.5 and them multiplying it by 2.205 and then rounding the lbs. to the nearest 5.0. We do these is because how these plates work in real life.
The chosen lift from the user simply is for calculating RPE as we need their lift max compared with the lift weight set in order to calculate RPE, so we simply make if statements if the lift was one of the three.
The weight they do for the set will be put into a variable base Weight. base Weight serves to be the lbs for conversion and will be used for the RPE calculation.display Weight will be just a simple weight to display the equlivent in kilos and used for getting the kilogram plates later.

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Again if the user decides the just KG for type of weight we will convert it acuuractly and put the LBS conversion in base weight. We have a function for converting the weight to LBS as well called convert_to_LBS(value). Lastly, we grab the the reps as this is crucial for calculating RPE since RPE is an estimate as how many reps more the athletes have after every rep they do, so RPE is directly correlated with that.

The Calculation for RPE:

This is the key idea to my program as calculating RPE can be simple but a bit complex at times and especially time consuming. First, we must find what lift they are going to do so we just add if staments since we only have three lifts. We take the weight they chose for the set(base Weight) and divide it by the liftMax. From there we will get a percent or decimal number. Then we use a function we made called closest value which basically finds the closest value in the list according to the product of our division which is lookupWeight. We now store that value in percent then make RPE_index = to the index of where that value is. Lastly before we do some other things to help the calculation, we make RPE = to that index on the rpe_scale list which will be the right index on the scale due to the alignment of the two lists.

To clean up the RPE we take account for the reps. Logically if you had an 8 RPE on a set that means by the end of the set you could have done two more reps, so if you add a rep then it became 9 RPE and one more its 10 or a max out. So, what we do, if reps is not 1 we add one to RPE for the range of 1 through reps. This will account for multiple reps within a set, so we still get an accurate RPE. Another problem arises here as well, what happens if the user picks a weight that is outrageously low compared to their one rep max, it will still add one rep for every rep so if they put 10 reps there is something bad bound to happen. We combat this by making the raw percent that is given which is lookupWeight and if its less than 0.63 or 63% of their one rep max, we will automatically assume it's less than 5 RPE because it will be because the weight is just way too low that even if you did 10 reps it would be nothing more than a warmup.

We also assume higher than 100% of their one rep max and higher that 10 rpe is known as >10 which means it's basically impossible if that's your actual one rep max. That's RPE in a nutshell.

Finding the Plates:

To find the plates it was quite interesting. It sounds as simple as dividing the total weight by the number of lbs but you then realize weight must be even on both sides when we are talking about barbell movements or else you would lose balance. So there for I started by making another variable called lbs_left and made it equal to the total LBS(baseWeight). From there I subtracted 45 because that's the standard weight of all barbells even in different countries. I divided it by the plate but what I did is made a function called find_Plates that detects whether the result was even or odd. If it's even, we can leave it like that as we will get the same amount on plates on both sides but if it's odd, we take 1 away from it. This will correctly display what the barbell looks like and to continue the subtract how many plates we used from lbs_left and continued til 0.

I took the same exact logic and applied it took kgs except I used kgs_left instead of lbs_left

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Visual

. Workout Companion

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Whats the goal of this app?

RPE Scale	Rate of Perceived Exertion
10	**Max Effort Activity** Feels almost impossible to keep going. Completely out of breath, unable to talk. Cannot maintain for more than a very short time.
9	**Very Hard Activity** Very difficult to maintain exercise intensity. Can barely breath and speak only a few words.
7-8	**Vigorous Activity** Borderline uncomfortable. Short of breath, can speak a sentence.
4-6	**Moderate Activity** Breathing heavily, can hold short conversation. Still somewhat comfortable, but becoming noticeably more challenging.
2-3	**Light Activity** Feels like you can maintain for hours. Easy to breathe and carry a conversation.
1	**Very Light Activity** Hardly any exertion, but more than sleeping, watching TV, etc.

Whats RPE?

RPE as demostrated from the graph above is the (Rate of Perceived Exertion Scale). Athletes use this scale to maximize their training by hitting a certain diffculty for the day so they leave room in the tank for upcoming sessions so they can hit

The home page known as /the_modern_lifting_companion
Serves to greet the user and also explain the purpose of the calculator and why RPE is important and what it is for the purpose.

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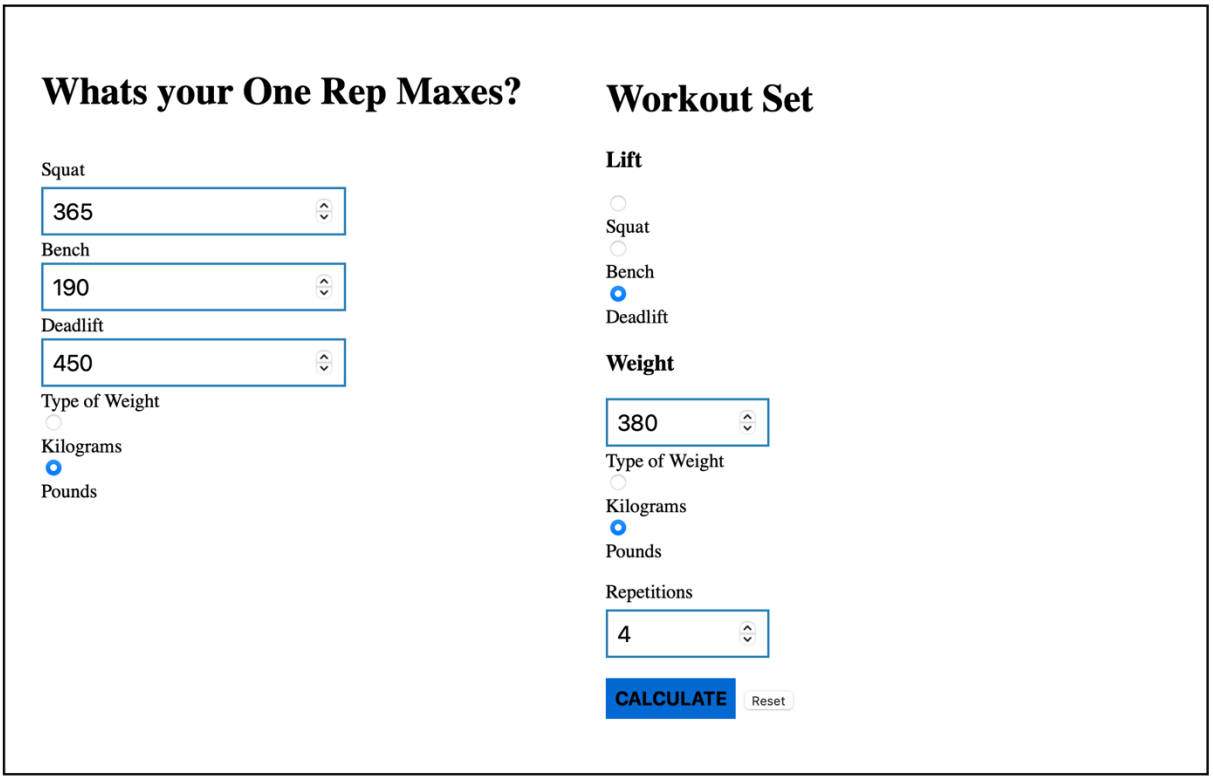
At the top you can click a button to get to the main companion.



From here you get a form that's preset but I put some info in it for demo calculations. You can choose everything from your one rep maxes to what lift you want to do, the weight, and the rep. We are all accounting that you can use the kilograms type of weight too.

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From here you can click calculate and get the result.

Workout Set:

Weight in LBS: 380

Weight in Kilos : 172.5

Amount of Reps: 4

RPE : 9

380 LBS On The Bar!

Plate Type	Pairs
45 LBS	3
35 LBS	0
25 LBS	1
10 LBS	0
5 LBS	1
2.5 LBS	1

172.5 KGS On The Bar!

Plate Type	Pairs
25 KG	3
20 KG	0
15 KG	0
10 KG	0
5 KG	0
2.5 KG	0
1.25 KG	1
0.5 KG	0
0.25 KG	0

Here the table will convert the weight and show it in both lbs and kilos. This is the set weight. Then the amount of reps and the RPE. We will also display to the user what the weight looks like in lbs. and kilos. The colors are for how kilogram plates are color coded in real life. That's our program.

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