Paying off your loans effectively

Alexander Jansing

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SUNY Polytechnic Institute

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- Minimum payments?
- Max interest first?
- Proportion based on interest rate?
- Proportion based on interest rate and the amount you owe on each debt?

Paying off the minimums every month is obviously the worst method possible, because minimum payments are calculated based your monthly interest plus one to three percent of your principal;

$$minimum = (P * R) * (P * .03)$$

(source: creditcards.com)

The general rule of thumb people usually follow is because of its simplicity; paying off loans with the highest interest rates first. because of my experiences with optimization methods in linear programming, I claim that this method is not the most efficient.

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But this seems too simplistic to me, perhaps if we try to distribute the pay some other way?

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Given n debts, each debt has a balance b and rate r. The rates are proportioned as $p_{r_i} = \frac{r_i}{\sum_{j=0}^{n-1} r_j}$ and similarly the balances are proportioned as $p_{b_i} = \frac{b_i}{\sum_{j=0}^{n-1} b_j}$. And from here your additional payment will be proportioned out based on the individual interest rate percentage multiplied by the percent of the total a certain debt made up.

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$$p_{r_i} * b_{b_i} * (extraAmountPayoff)$$

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I created a shell script that ran the program against various *extraAmountPayoff* amounts; PAY.SH. In the latest iteration of the program, the following times were recorded for running times:

extraAmountPayoff	*Serial*(*seconds*)	*Parallel*(*seconds*)
10	0.0123219490051	0.00575304031372
100	0.00804305076599	0.00271987915039
1000	0.0045371055603	0.00170397758484
10000	0.00340819358826	0.00142216682434

```
Testing on 10
It cost you $ 360326.0 to pay off $ 185000.0 in loans over 370 months
It cost you $ 353687.0 to pay off $ 185000.0 in loans over 208 months
It cost you $ 355178.0 to pay off $ 185000.0 in loans over 371 months
It cost you $ 355253.0 to pay off $ 185000.0 in loans over 208 months
Program took 0.0121970176697 seconds to execute.
Testing on 100
It cost you $ 360326.0 to pay off $ 185000.0 in loans over 370 months
It cost you $ 329319.0 to pay off $ 185000.0 in loans over 133 months
It cost you $ 334279.0 to pay off $ 185000.0 in loans over 371 months
It cost you $ 334021.0 to pay off $ 185000.0 in loans over 133 months
Program took 0.00971794128418 seconds to execute.
Testing on 1000
It cost you $ 360326.0 to pay off $ 185000.0 in loans over 370 months
It cost you $ 268210.0 to pay off $ 185000.0 in loans over 62 months
It cost you $ 278155.0 to pay off $ 185000.0 in loans over 371 months
It cost you $ 272415.0 to pay off $ 185000.0 in loans over 62 months
Program took 0.00461387634277 seconds to execute.
Testing on 10000
It cost you $ 360326.0 to pay off $ 185000.0 in loans over 370 months
It cost you $ 187106.0 to pay off $ 185000.0 in loans over 15 months
It cost you $ 209129.0 to pay off $ 185000.0 in loans over 369 months
It cost you $ 194661.0 to pay off $ 185000.0 in loans over 16 months
Program took 0.00266194343567 seconds to execute.
```