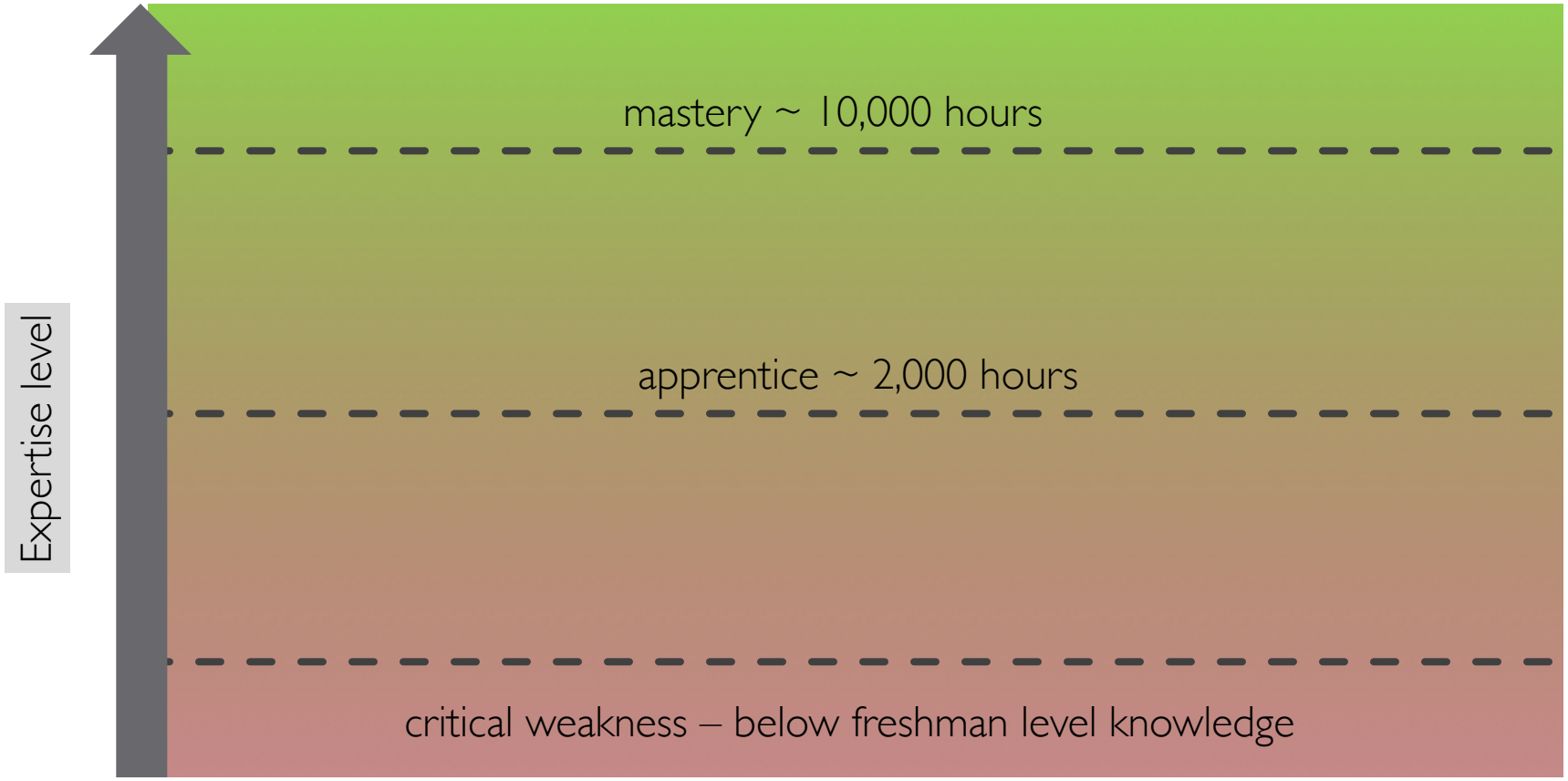
bioinformatics secrets

The Bioinformatics Skill System

Role-playing games

What would a bioinformatics skill system look like?

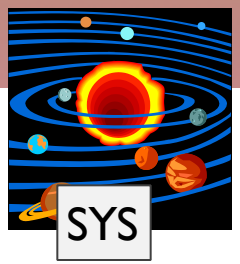
Laying out your skill bar



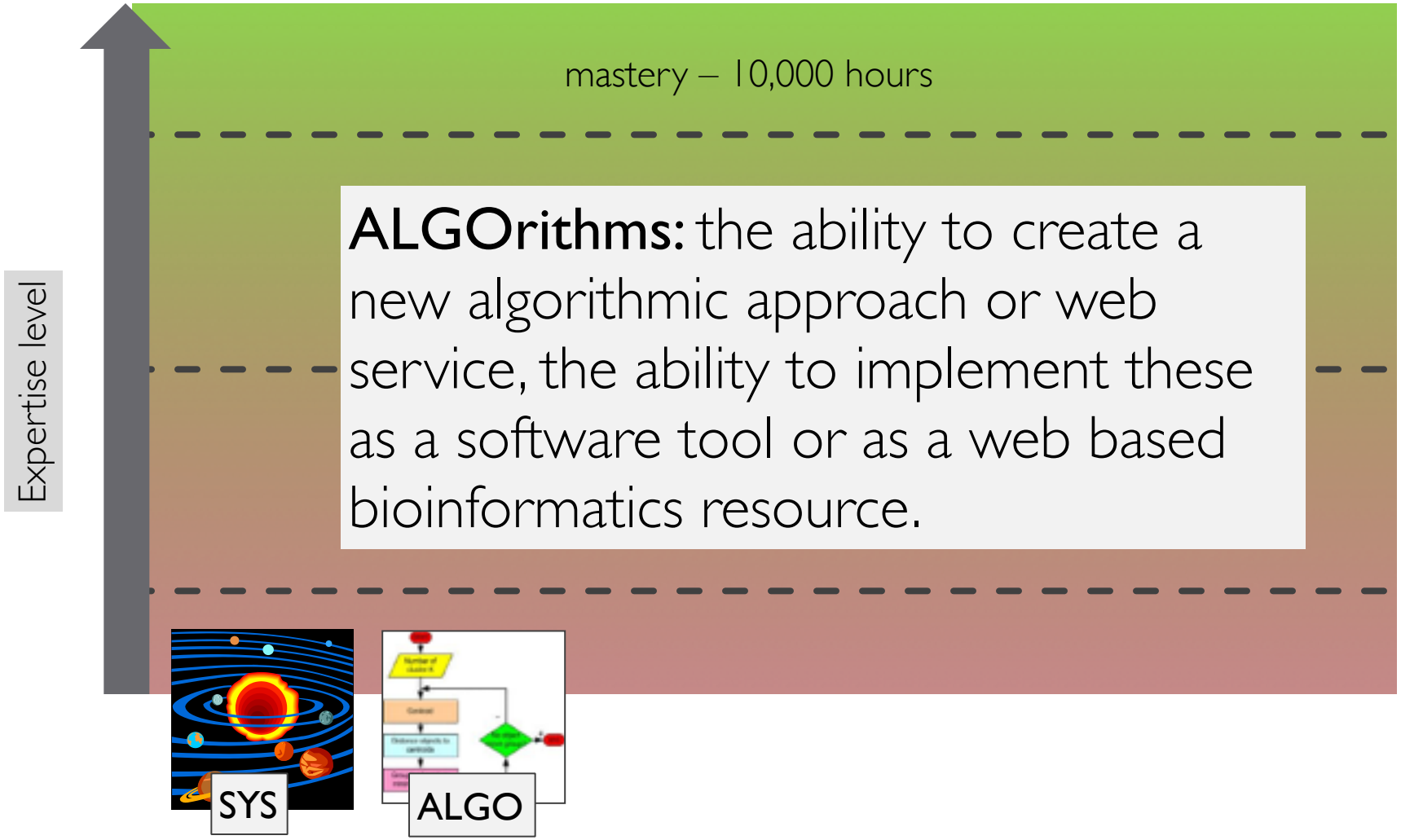
Laying out your skill bar: SYS

Expertise level

SYStems: the ability to identify, understand, run, troubleshoot, chain together the countless bioinformatics tools and techniques that have already been created.



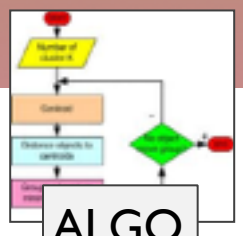
Laying out your skill bar: ALGO

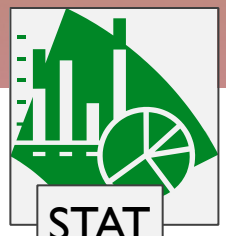


Laying out your skill bar: STAT

Expertise level

STATistics: the ability identify and apply the proper statistical method. The ability to devise a new statistical approach to extract a new type of knowledge from the data

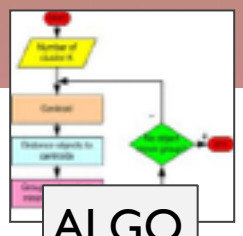


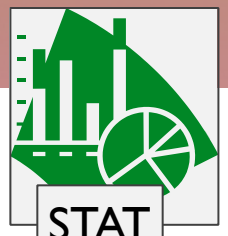


Laying out your skill bar: BIO

Expertise level

BIOlogy: the ability to interpret bioinformatics data/results in the proper biological context, the ability to devise/ imagine a new computational approach/ technique to measure novel biological attributes



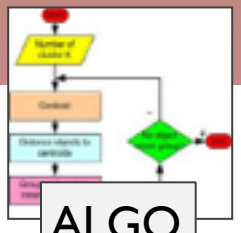


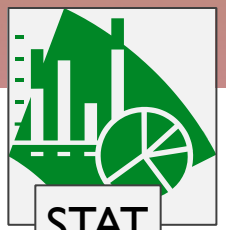
Laying out your skill bar:VERB

Expertise level

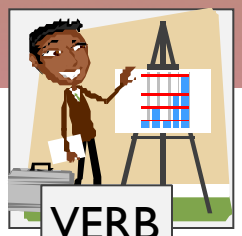
VERBal: the ability to understand the goals and needs of individuals from diverse backgrounds. The ability to communicate with these same individuals.


SYS

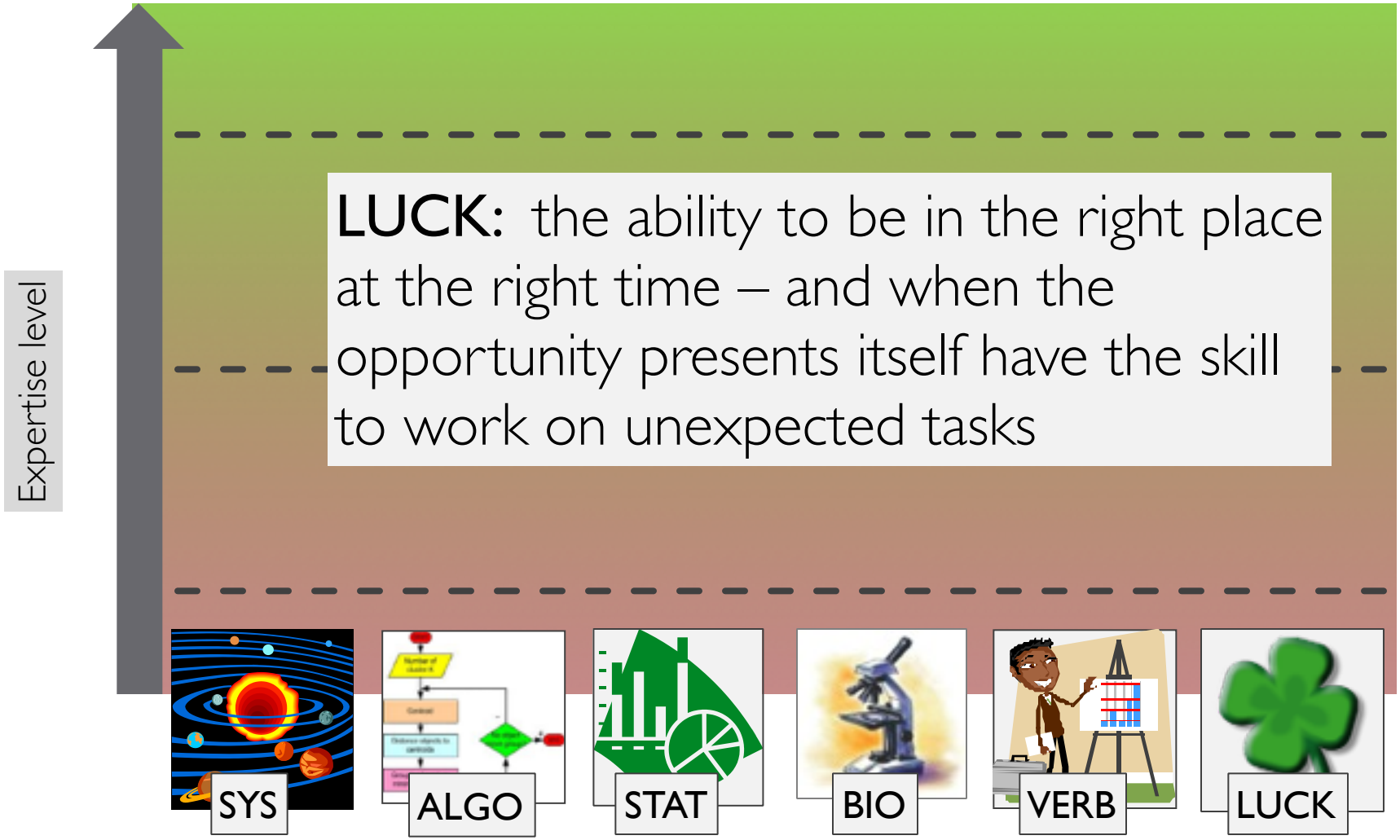

ALGO


STAT

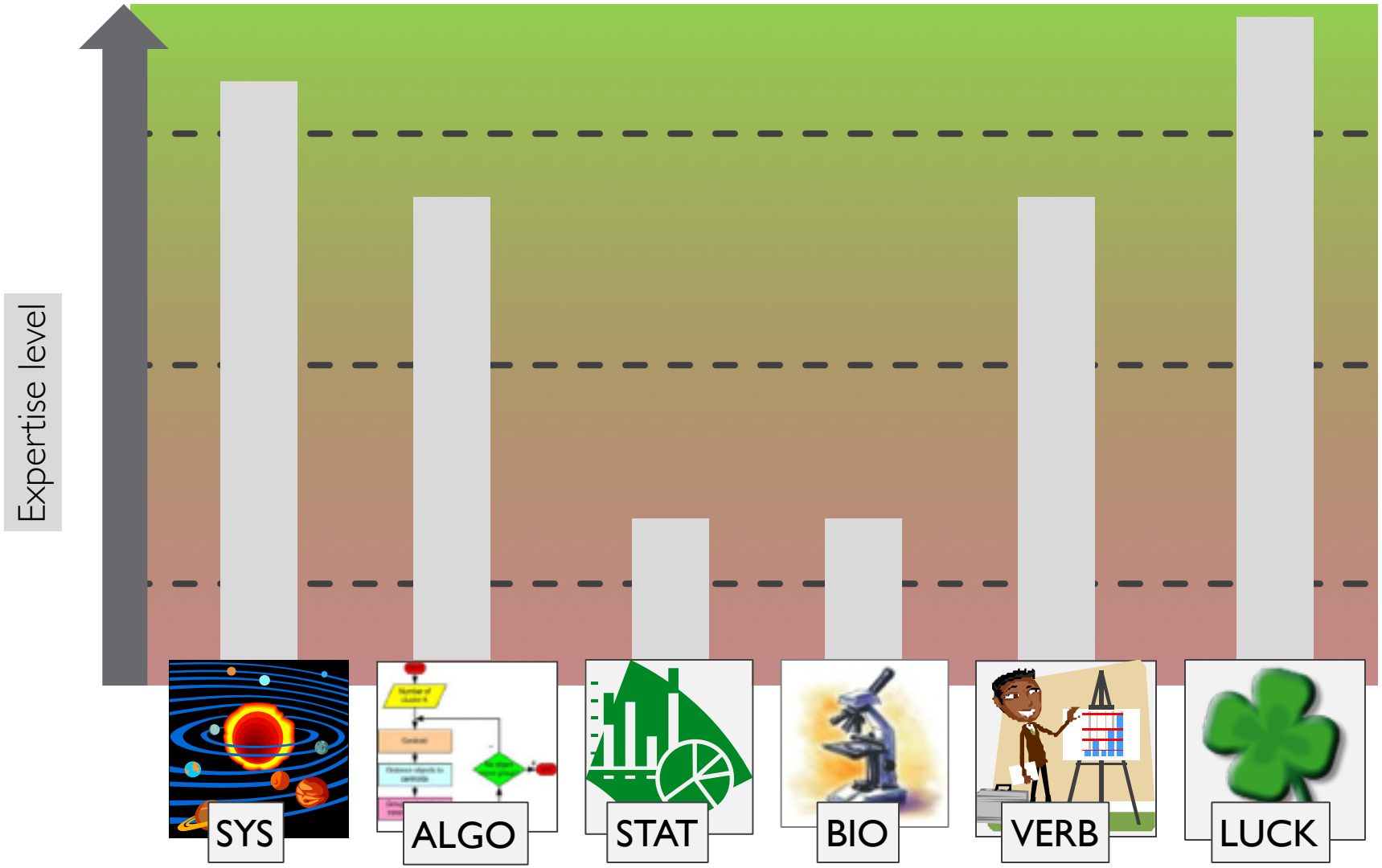

BIO


VERB

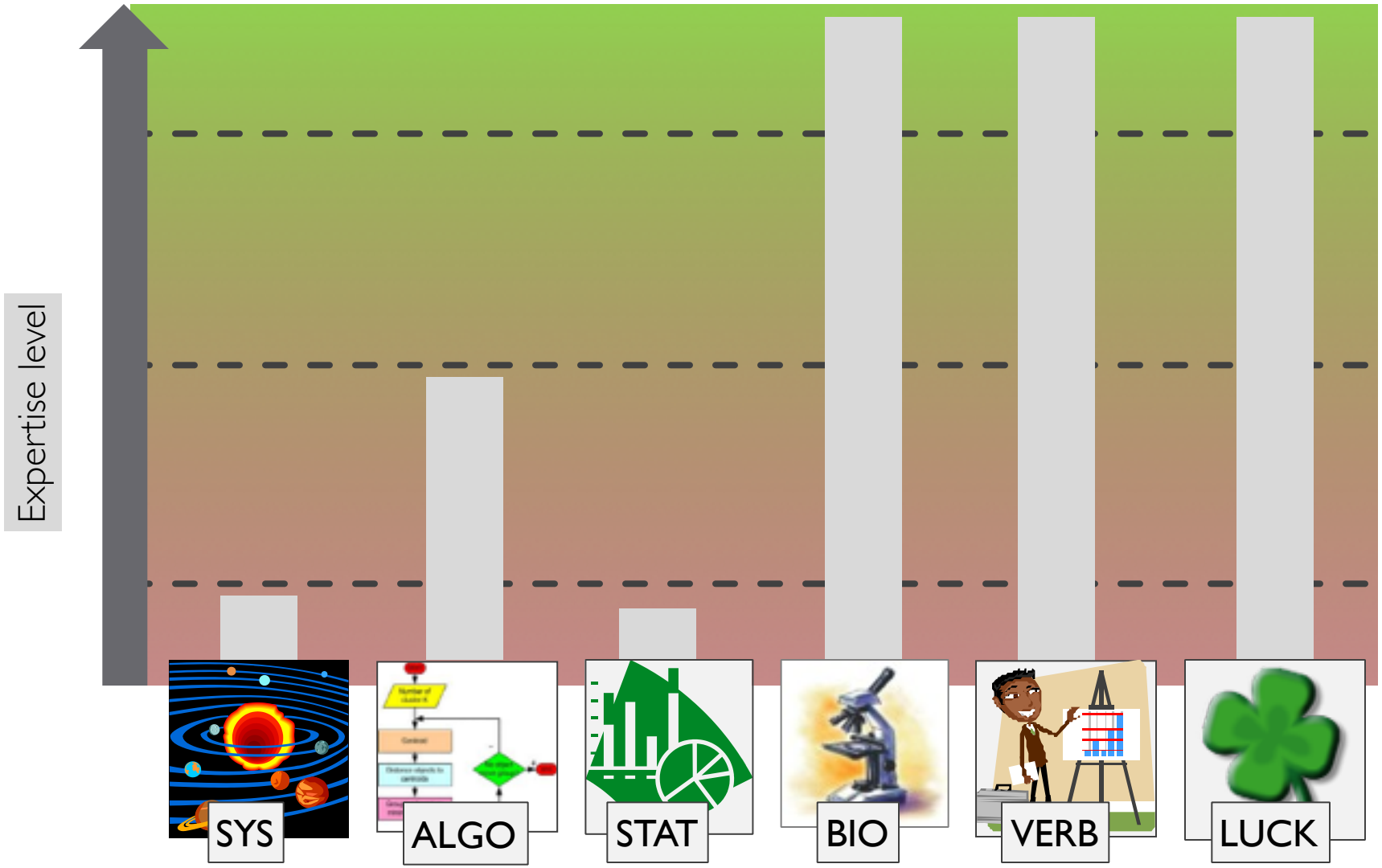
Laying out your skill bar: LUCK



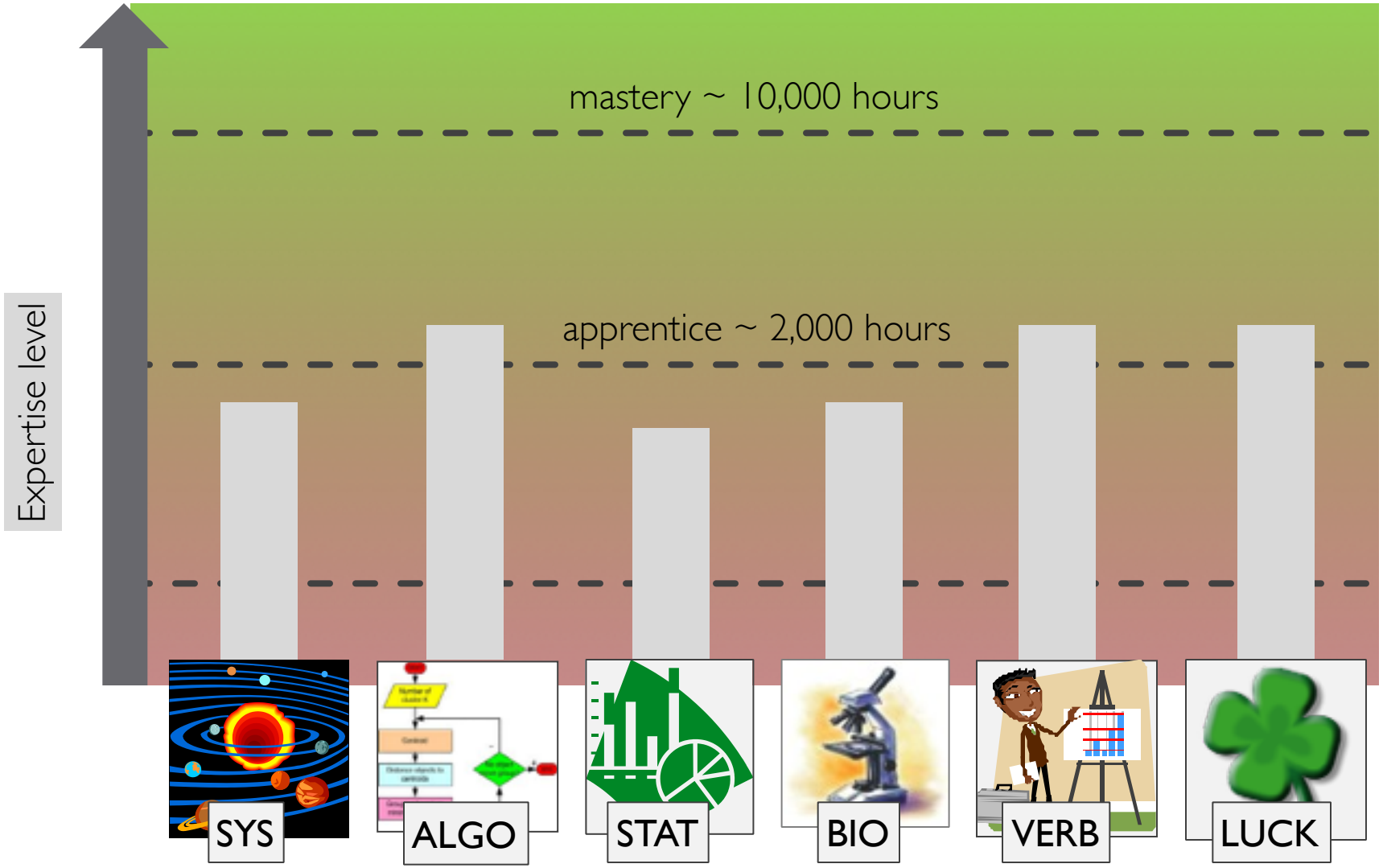
My skill bar



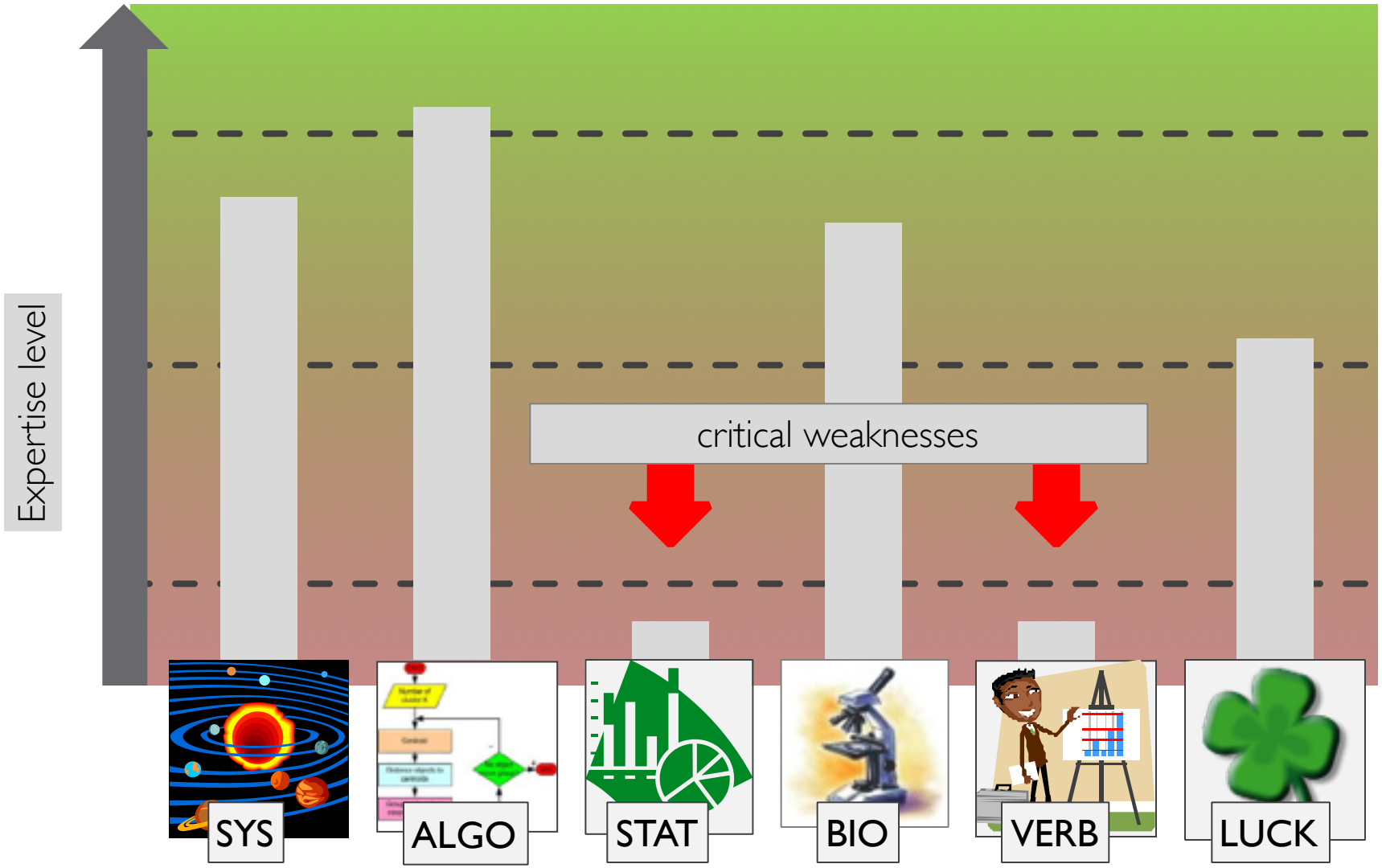
A collaborator of mine



Averages are not all that great!



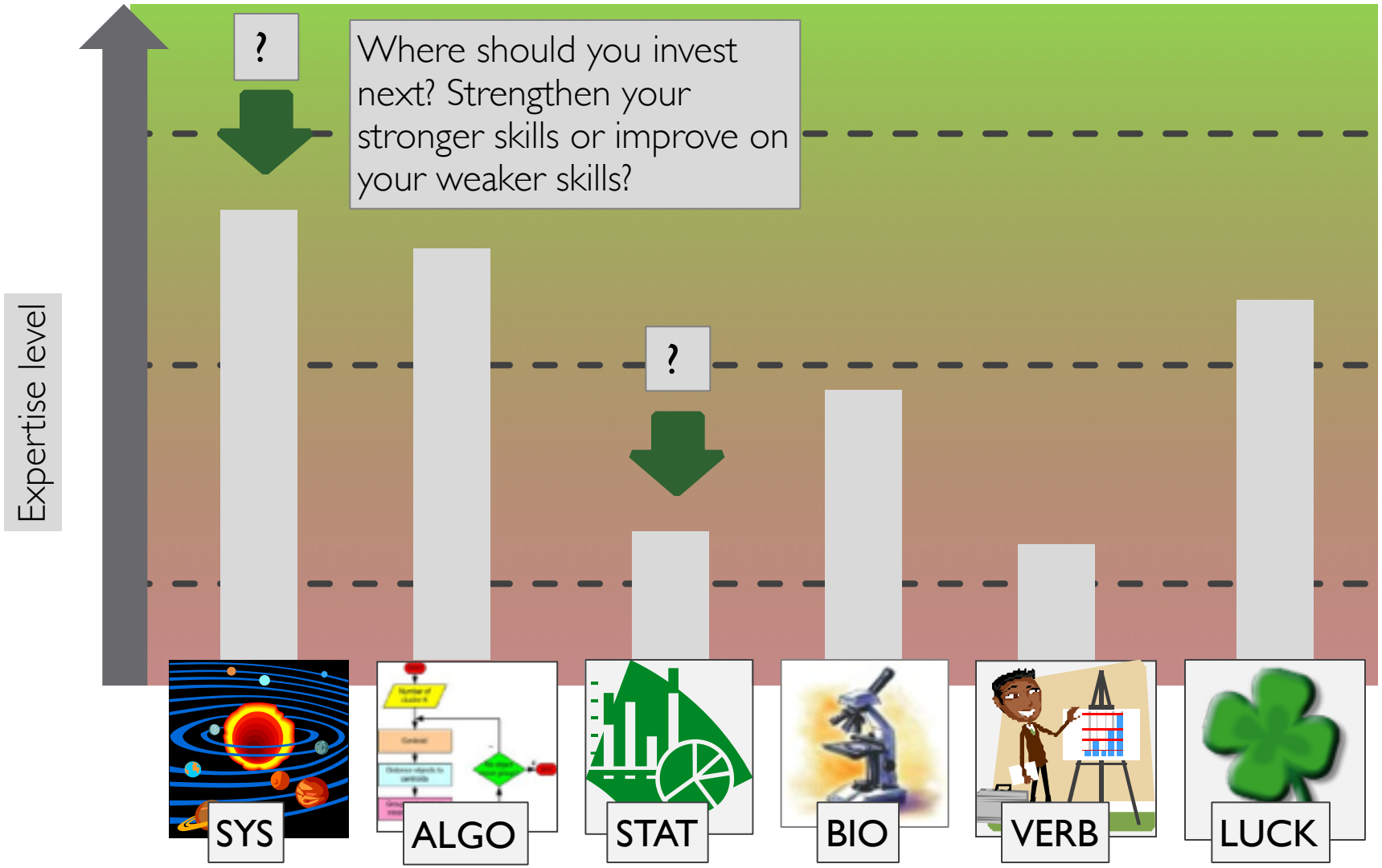
First: fix critical weaknesses!



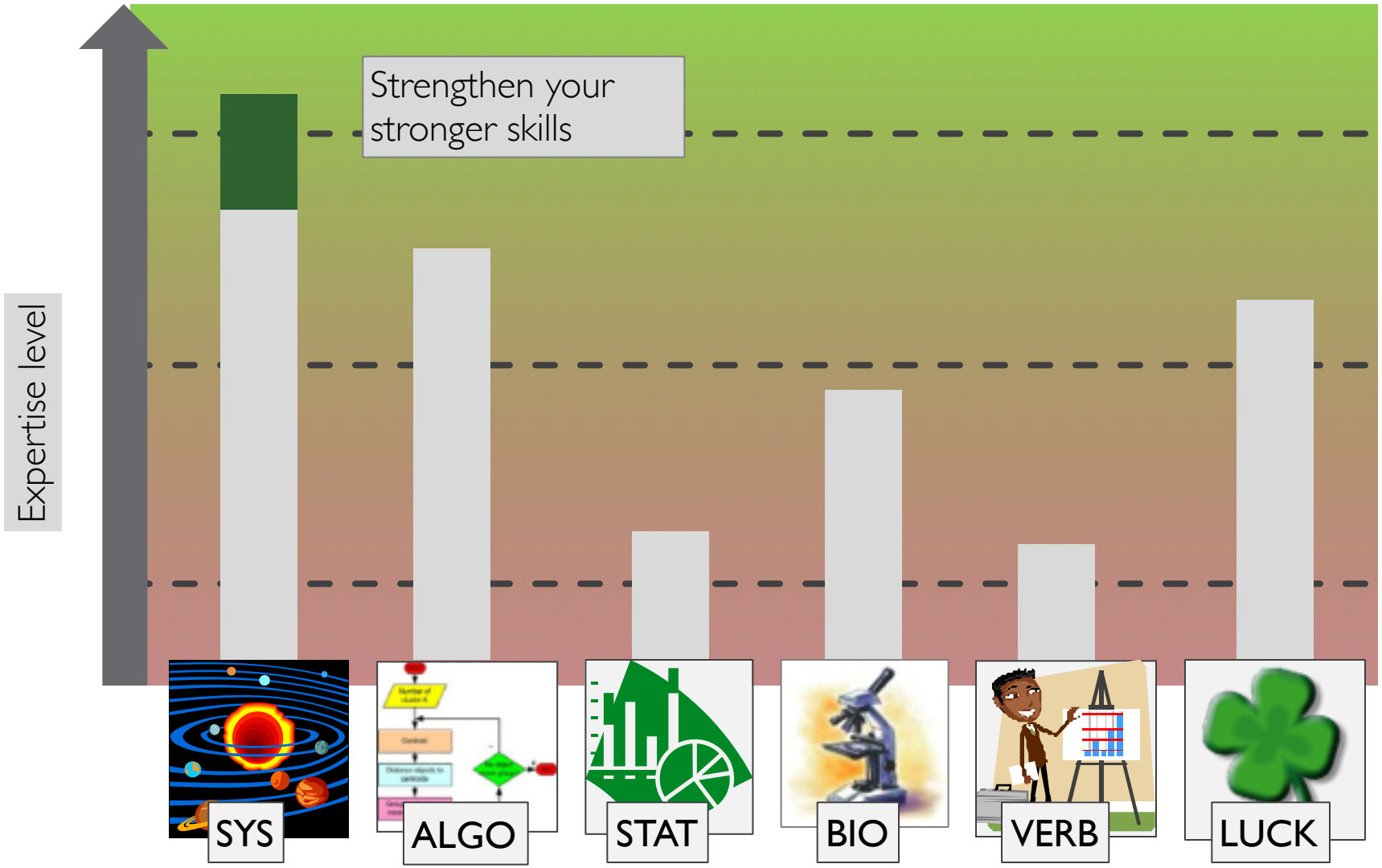
First step: core competency

- There is no need to take a graduate level courses – those may even be counterproductive!
- What you need is freshman level knowledge
- BUT the goal is not to know enough to **PASS** such a course with a good grade!
- Master and internalize the knowledge
- You don't need to even enroll – plenty of self study materials

No weaknesses? Now what?



Improve your strenghts



Strengthen your strong skills!

- Invest into what you are already good at!
- We need experts in various domains
- People with complementary skill-sets are more valuable
- Differentiate yourself

Make your own luck!

- Luck favors the prepared (Luis Pasteur)
- Expand your knowledge:
  - Do work that does not directly relate to your research!
  - Explore on your own – how do people do a certain task?

Unique opportunities

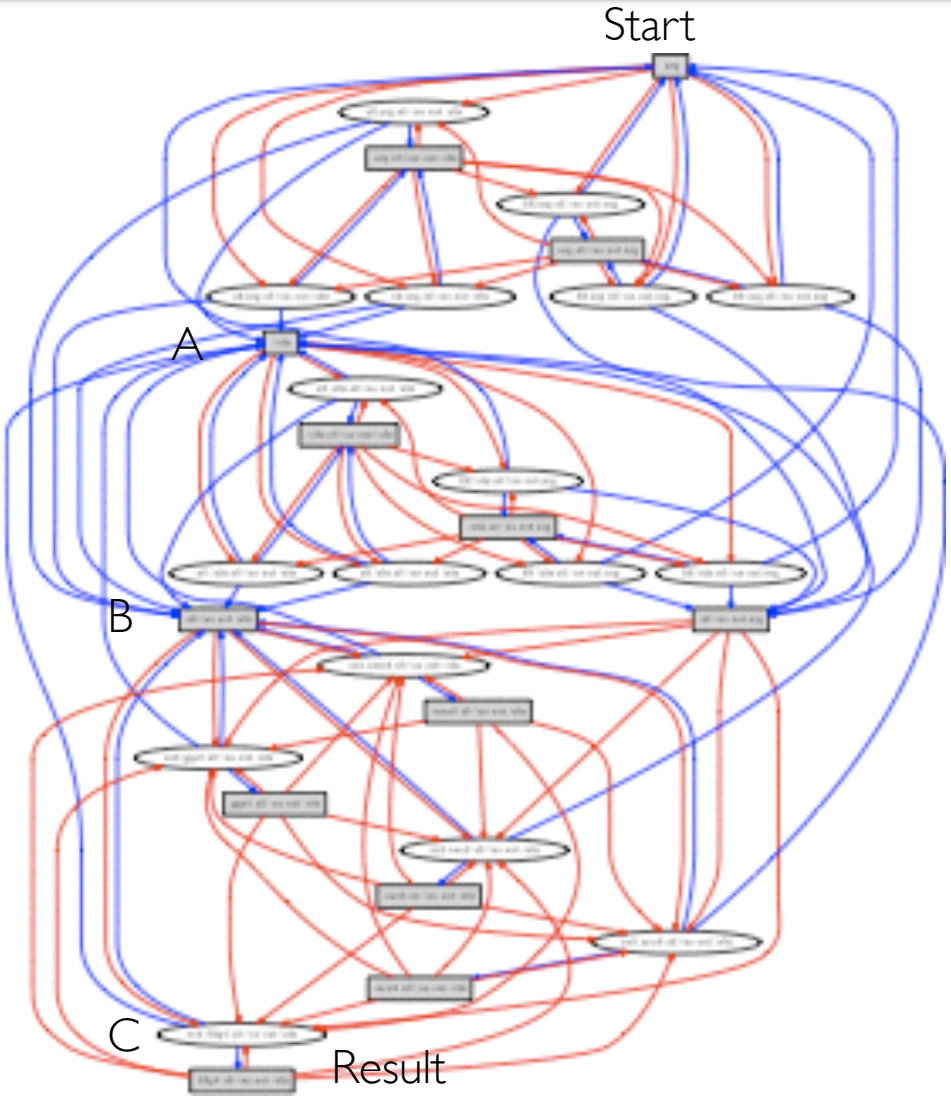
- There is no other field of science where redoing another study would be easier – all you need is a computer and the data
- **Pick a paper that interests you and redo it!**
- Compute the same quantities for a different genome/annotations

Bioinformatics is relatively simple

- The complexity lies in having to make a **very large number** of **simple** decisions
- The majority of these need to be correct!
- Methods sections in papers are misleading, they show a straight process:

In reality this is not what happened AT ALL!

The path to knowledge



We need to try a large number of approaches …

… some of which will go better than others …

… each biological problem is a little different from the other…

… has its own peculiarities and quirks …

… when we redo a study we truly learn the decision making that needs to happen at each step…