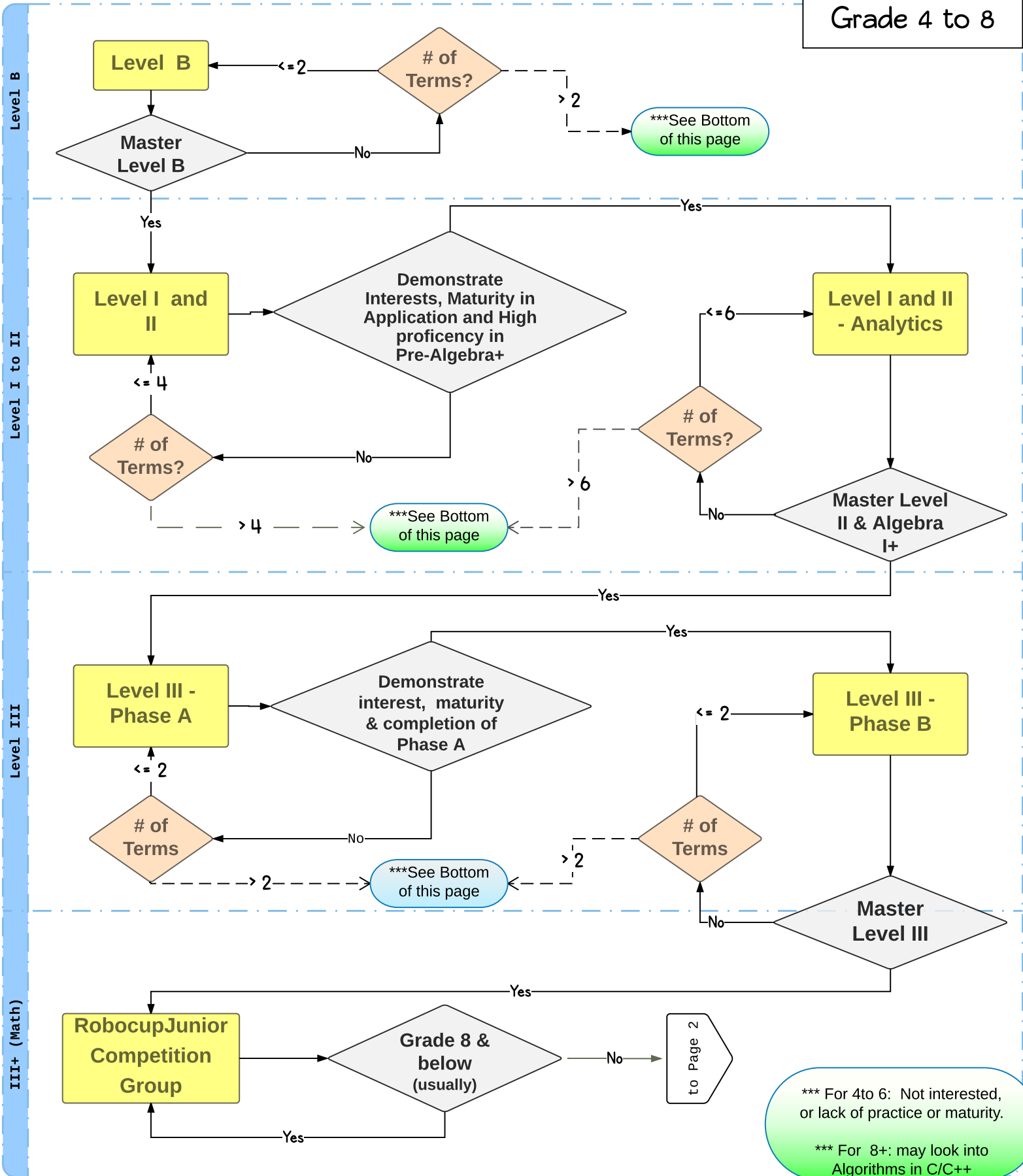


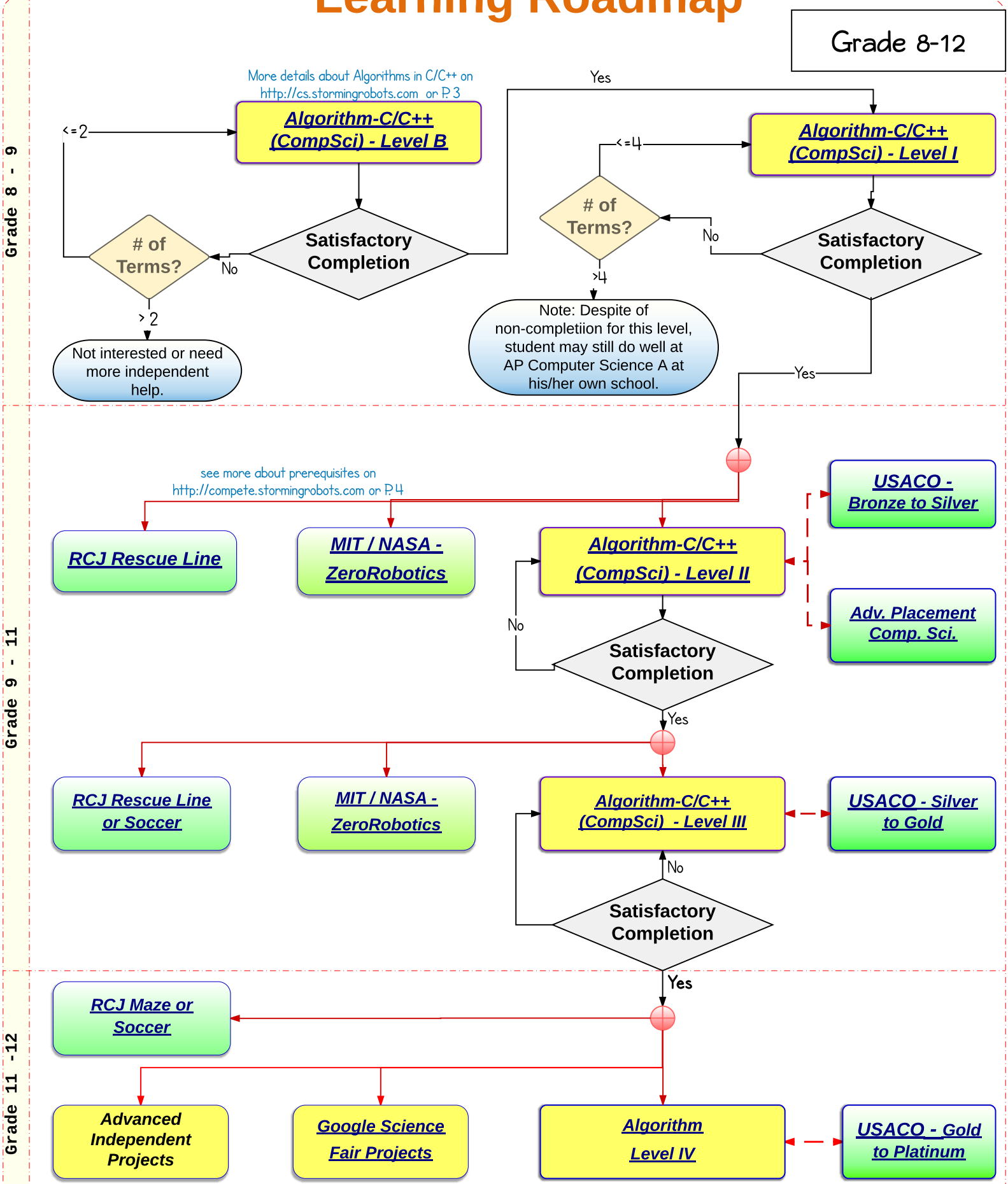
Learning Roadmap

Grade 4 to 8



*** For 4to 6: Not interested, or lack of practice or maturity.
 *** For 8+: may look into Algorithms in C/C++

Learning Roadmap



Algorithms in C/C++

Computer Science Sub-Group

<http://cs.stormingrobots.com>

Detailed syllabus at : <http://cs.stormingrobots.com>.

Many things in the world involve automation in this technology age. Good Computer Science program go far beyond just programming itself but mainly problems solving skill with computing, even for grade schools. While Robotics animates Problem Solving effort, Computer Science with computational thinking strengthens the foundation.

This sub-group aims to build that core foundation and sharpen students' problem solving skills in computing world, no matter whether in engineering, or even liberal arts fields.

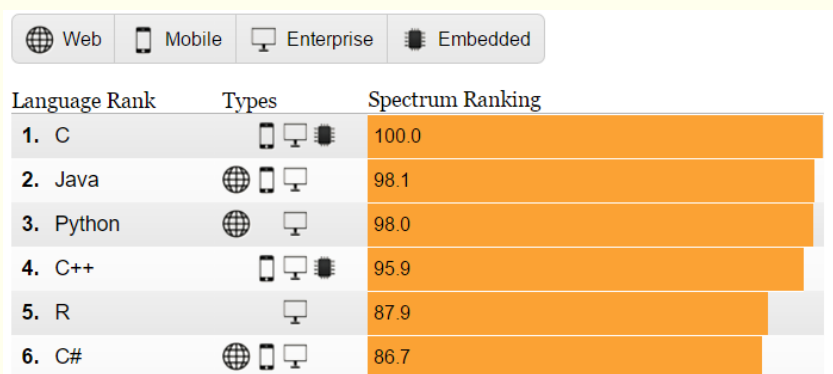
Characteristics:

1. Stress in Computational Thinking and Efficiency.
2. Focus on problems solving/software development skill, so students will not work with a physical robot.
3. Self-paced. Students will be allowed to move quickly to the next concept when they demonstrate satisfactory level of understanding through their homework and pop-quiz in class. Those with gaps in their prerequisite knowledge will receive additional exercises to address the shortcomings.
4. Excellent work quality requirement. All assigned exercises are to be completed with excellent quality, with efficiency, memory consumption, readability, maintainability, etc. This is to ensure all students will master a concept and build a strong foundation before tackling new concepts.
5. Allow students to embed other competitions in-between levels.

Why C ?

C programming allows high flexibility and the power to perform closer to the machine than “modern” languages. It is still often used in embedded systems or high-performance computing. It is considered to be lingua franca of programming. We focus on educating students to “understand” the underlying structure, think efficiency and analysis with algorithms. *This aims to equip students the skill to adapt the rapid changes in the mechanics of future modern languages and various algorithms and optimization techniques, not to learn a specific language.*

The Top Programming Languages along a different axis of popularity - published by IEEE (26th July, 2016)



Competitions, Advanced Project

<http://compete.stormingrobots.com>

<http://mp.stormingrobots.com>

Competition is one of the multiple channels where they will apply all the knowledge that they have compiled throughout their Roboclub sessions, and summer workshops. Another channel is through Advanced Projects (required building online portfolio). Students further strengthen their knowledge base through hands-on, scaffold environment where new concepts constantly are introduced.

We choose only the competitions and projects which are artificial intelligence oriented. Our program aims to help in bridging students from high school not just to competitive colleges, but far importantly, to become a resourceful, self-driven life-long learner. History has shown SR alumni has gained competitive edge in obtaining internship in College.

Main goals of our participation into any of the competitions and independent advanced projects are to:

- Sustain motivation and inspiring more inquiries in in-depth knowledge about system engineering through robotics;
- Encourage students to delve in learning about full automation, and exploration in the realm of artificial intelligence.
- Strengthen competitiveness in science and technology, with integrity, sportsmanship, and professionalism.

MIT/NASA ZeroRobotics

- Heavily Mathematics and physics oriented
- High School only.
- Online competition working with virtual simulation.
- do not work with physical robot. The physical robot is the Satellite itself located in MIT and Space!

RCJ = RobocupJunior

- AI-oriented, Algorithms-based Tournament
- Age : 11-18. Open Leagues
- Students are expected to improve their platform year after year, that includes hardware and software
- Usually participate in the same game throughout several years.
- From USA to World Event .

Advanced Independent Projects

- not a competition
- High School Only.
- Duration depends on project scope.
- Require strong work discipline.
- Create Engineering / Computer Science Maker Portfolio.
- Opportunity to conduct Tech Talk in public forum.

Google Science Fair:

- High School only.
- Require vigorous schedule and work discipline
- Opportunity to conduct Tech Talk in public forum.
- USA Event

USACO:

- USA Computing Olympiad
- Age 13+ (usually high school only)
- Heavily Algorithmic based programming.
- Online Exams from Bronz to Platnium levels.
- From USA to World Event