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A High School Administrator's Guide to Hackathons

Hackathons have grown to become a global student movement. By fast-tracking the software and hardware development process, hackathons provide students with valuable technical skills they will need in their future careers. Students learn by doing and finish with a final project that the potential to turn into a real business. Collaborating in a high-stakes environment, students learn how to work effectively on a team. Students meet like-minded peers from around the world and also have a chance to interact with professional engineers and recruiters. Their new motivation and creativity remains after the hackathon, as hacker culture grows and a more diverse array of students travel to other collegiate hackathons to make new friends and win prizes.

What is a “hackathon”?

A hackathon is an invention marathon. Programmers, designers, builders and more come together to learn, build, and share their creations over the course of a few days. Hackathons are not limited to computer science majors — anyone who has an interest in technology and is eager to learn can participate in a hackathon.

Not to be confused with illegal and unauthorized programming, “hacking” in this context means quickly and intelligently creating a real application that others can use. Although the term “hacking” has previously been associated with gaining access to a computer system with a malicious intent, “hacking” has started to transition into a positive term describing the actions of innovators who are creating prototypes of their ideas. Programmers have rallied around the term “hacking”, as a term to describe their love of learning and their efforts to build the future.

Teams of two to six students work together over a weekend to develop a product, learning about new technologies and making friends along the way. Hundreds, sometimes thousands of students gather on the weekend to learn new technical skills and soft skills. At hackathons, students can augment skills learned in the classroom by teaching themselves how to independently research new technologies and fix problems they encounter. Hackathons allow students’ intrinsic interests to drive their education. Every time a student encounters a new challenge at a hackathon, they must learn how

to fix the problem through independent study. By giving students an opportunity to individually build a project from start to finish, students develop increased critical thinking skills and have a chance to become better prepared to enter the workforce.

Students enter a hackathon with a blank slate — they cannot bring in a school project. Once a student has found a team to spend the weekend with, they enter the brainstorming phase. After collectively deciding on an idea to work on, students on the team spend a majority of the event transforming this idea from concept into reality. Whether the idea is a hoverboard or [an app to teach you to drive](#), hackathon teams bring a project from epiphany to completion all within a single weekend. Expert mentors from professional development backgrounds work through the night to help students with their projects. Many mentors wish they had this level of support in their youth and strive to help the future generation of programmers.

I wish I could have attended hackathons as a student. As a mentor, I'm glad I can help the next generation of programmers discover their passions, learn new skills, try out concepts they have learned in class, and build real applications that real people can interact with.

— John Britton (GitHub Education Lead)

The overnight aspect of a hackathon is integral to allow students the time they need to complete their projects. Most hackathons conclude with a science-fair-style exposition of projects that includes celebrity judges directly conversing with students about their projects. Winners are chosen, prizes are dealt, and the top teams give a live demo of their project on stage.

How popular are hackathons?

Students have been tinkering with technology since Bill Hewlett and Dave Packard built their first machine in their garage. However, the availability of cheap and accessible technology and learning resources have allowed for an explosion of “hacker” culture, opening up a new generation of students to this type of practical and hands-on education. From the very first student-run collegiate hackathon in 2009, the number of student-run hackathons has exploded to over 150 throughout the world in 2015. With over 50,000 annual participants, demand has been nearly doubling every semester. Ranging from 50-person gatherings to 1,500-person, 36-hour coding marathons, these events come in all shapes and sizes. Large hackathons like those run by the [University of Pennsylvania](#), the [University of Michigan](#), or [Stanford University](#) fly in students from around the world for a weekend of fun competition. Many other colleges such as [Rutgers University](#), [Princeton University](#), or the [University of Illinois](#) keep a local and close-knit atmosphere by limiting the size and encouraging beginners to attend. A few of the top high schools have started to host their own hackathons. [Bergen County Academies](#), [Thomas Jefferson](#), and [Downingtown STEM Academy](#) hold some of the largest and

well-known high school hackathons. Major League Hacking also organizes [Local Hack Day](#) hackathons, or local “mini-hackathons.” They are great for students wanting a taste of the hackathon experience, and they have grown to become a worldwide event.

The hackathon movement has been growing exponentially, with more schools around the world joining the mix every season.

Why are hackathons important?

Students

Hackathons are extremely beneficial for both hackathon organizers and attendees. Organizers learn how to manage a team, fundraise, and plan a complex and large-scale event that empowers their fellow students. These passionate students establish industry connections which not only create employment opportunities for the students, but it also puts a school on the radar of important donors and corporate partners. More importantly, countless students get to spend a weekend having fun, meeting new people, and preparing themselves for technical careers. Hackathons provide a real-world experience for students, as they compete in teams to create a product. Similar to the product cycles of a startup company, hackathon teams quickly transition from the idea stage to the final product. Students have a chance to gain time management skills, along with technical expertise and new connections. In addition, students get to spend one-on-one time with expert mentors who spend the hackathon teaching students new technical skills and helping students with their projects.

Students have worked on truly innovative and cutting-edge projects. Some of these projects have even gone on to turn into real companies:

- [Workflow](#) went from an app built at the University of Michigan’s hackathon, by a team of all high school students, to one of the top apps in the iOS app store. It has been covered by the [Wall Street Journal](#) and [The Verge](#).
- [Cosmos Browser](#), an app allowing individuals in third-world countries to connect to the internet through text messages, was also built in 36 hours at the University of Michigan’s hackathon by a mixture of high school and college students. Cosmos has been extensively covered by news sites like [FastCompany](#), [Engadget](#), and [The Smithsonian Magazine](#), and it has received [funding](#) as part of the 2015 batch in Techstars Startup Accelerator.

What happens after the hackathon is just as important as the event itself. A hackathon leaves a student body invigorated and eager to spend their free time working together on projects. Not only do students attend more hackathons and win more prizes at them, students are more motivated to sacrifice their free time to learn more about computer science and working on projects with their peers. This is especially evident at the Bergen County Academies high school. The number of signups for a nearby college hackathon

at Rutgers University (HackRU) skyrocketed after Bergen County Academies' first hackathon in March of 2014. Increasing from the handful of Bergen County Academies students who signed up for HackRU in 2013, over 60 students signed up in the fall of 2014 and 100 signed up in the spring of 2015.

Since running our hackathon, interest in Computer Science has grown tremendously here at our school. We offered new coding classes over the summer and have added new Computer Science courses to meet the additional demand from our students. I believe hackathons are a great way to promote student interest in Computer Science.

— Mr. Russell Davis (Principal at the Bergen County Academies)

Hackathons help students build up their resumes and learn the latest and most popular programming technologies. In a weekend, these students get to network with popular technology companies ranging from industry leaders like Dell to up-and-coming startups like Twilio and gain new connections to help them find internships and jobs in the future. They also have a brand-new project to bolster their resume and new technical knowledge to improve their skill set and broaden their horizons. In addition, many hackathon sponsors attend and send recruiters to hackathons with the sole intent of finding and mentoring new talent. According to our Winter 2015 Hacker Survey, 63% of attendees have included projects made at hackathons on their resume. In addition, 56% over attendees believe that their projects improved their position with their employer. Hackathon attendees not only learn new skills and meet friends, they also improve their future internships.

Hackathons change students' lives. Hackathons inspire students to learn more about computer science and work to turn their ideas into reality.

Schools

By increasing name recognition, boosting student culture, and sparking corporate partnerships, hackathons have become one of the most effective tools to improve excitement around the computer science program at any school and build active learners. It is clear hackathons are going to be an integral part of the education of any technology oriented student within the next few years. Computer science powerhouses such as Stanford, MIT, UC Berkeley, and the University of Pennsylvania have already embraced hackathons as an educational tool. In addition, high schools like Bergen County Academies, Thomas Jefferson, and Phillips Exeter Academy have shown that hackathons can be just as successful on the high school level. Hundreds upon hundreds of schools have already benefited from hackathons, but there are many more schools that have yet to provide their students with this opportunity.

Hackathons are one of the most effective tools for practical computer science education, and all schools that host a hackathon can supercharge their computer science program and the culture of their students. Only schools with the great hackathons will be viewed as frontrunners in computer science education. Students flock from schools throughout the world to attend hackathons, and word spreads quickly.

Famous judges and big corporations attract the spotlight and can even lead to lasting and sustainable partnerships. As hackathons bring sponsoring companies onto their campuses, more companies are introduced to that school. The Bergen County Academies (BCA) hosted their first hackathon, [hackBCA](#), in 2014. One of the title sponsors of hackBCA was Flatiron School, a nearby startup that runs courses to teach both students and adults to program. Flatiron School was given a chance to visit the school, talk with students and faculty, and tour the computer science facilities. Not long after this hackathon, Flatiron School and BCA collaborated to launch a [summer coding class](#) at the school. At the hackathon, Flatiron School instructors and BCA's teachers were given a chance to talk, and some BCA teachers started to teach workshops at Flatiron School. Similarly, other sponsors such as Intel and Wolfram Research provided training for teachers and electronic equipment for classrooms.

Hackathons attract a lot of media attention ([NYTimes](#), [WSJ](#), [LATimes](#)), which benefits both students and schools. Students get to showcase their projects for a national audience, while schools gain prestige and advertise their cutting-edge programs. Computer science faculty also get a chance to meet, interact with, and develop relationships with professionals at the cutting edge of technology. The fact that a school allows their students to run a hackathon shows that a school is devoted to staying on the forefront of technology education and empowering their students to lead the charge.

Hackathons are important from an admissions perspective. If allowed to participate, high school students attend many collegiate hackathons. Attending hackathons helps students get into their favorite colleges by providing the experience, awards, and knowledge necessary. In addition, high schools that host hackathons stand out as exemplary institutions that more middle school students will want to attend.

The University of Michigan, for example, works closely with its hackathon to find the best high school hackers for their incoming class. Michael Mattheakis (University of Michigan Class of 2018) spoke about the impact of MHacks on his life, "Going to MHacks while in high school was a huge factor in me deciding to go to Michigan for the next four years. Seeing the energy and entrepreneurial spirit first-hand was more than any college tour could possibly demonstrate." The national Major League Hacking ranking provides a [quantifiable](#) way for high school students and other individuals to measure the programming student culture at schools.

Hackathons can put a school's computer science department on the map, along with making a visible impact in students' lives from all over the world.

Industry

Not only are hackathons beneficial to students and schools, they greatly aid the computer science industry and prepare the next generation for jobs in this field. There are not nearly enough trained computer scientists to fulfill the need for programmers. [According to Code.org](#), there will be 1,000,000 more computing jobs than computer science students by 2020. Computer science can be intimidating, and hackathons have done a great job of encouraging people to learn to code and enter the field.

In addition, many hackathons work hard to encourage students of all demographics to attend. Without regard to a student's race or gender, hackathons are inclusive and remain open for any student to attend. One of the most powerful aspects of hackathons is their community, which is an important aspect with regard to helping under-represented groups feel welcome.

...the recruitment and retention of women in engineering-related fields can be increased by providing opportunities to develop student-to-student relationships.

Akl, Robert G., David Keathly, and Ryan Garlick. "Strategies for Retention and Recruitment of Women and Minorities in Computer Science and Engineering." *Innovations 2007: World Innovations in Engineering Education and Research* (2007).

The academic study quoted above came to the conclusion that making sure students from underrepresented demographics feel like part of a community is an extremely effective method of both retaining and gaining participants from minority communities. Hackathons foster these important student-to-student relationships, as mentioned in the study, and are a powerful tool to help diversify the technology industry. That is, because of the strong community present at hackathons, they serve as a great way of welcoming all students, without regard to their background.

Why do we love hackathons?

Hackathons have changed the lives of every employee at Major League Hacking. Thousands of students have left hackathons with a new motivation to learn and create. Our very own Jon Gottfried wrote an [article](#) on his first hackathon and his experience there.

What do you need to host a hackathon?

Hosting a hackathon requires minimal effort from a school. There are three main necessities required for every hackathon: food, WiFi, and power. Without enough food,

hackers will be hungry; without WiFi, hackers can't build their projects; and without power hackers' devices will die. Organizers should also set aside time to verify their venue layout with a fire marshall to ensure no problems will arise. It takes time to plan the other aspects of a hackathon, and ensure that the three main necessities are accounted for. Most hackathons take around 4—6 months to plan, but it is highly recommended to start planning as early as possible. A large amount of time will be spent fundraising, but as hackathons become more prevalent this process will become easier. Major League Hacking has put together an extensive guide to hosting a hackathon which is available at guide.mlh.io.

How can organizers ensure that hackathons are safe for attendees?

All hackathons should take special precautions to ensure the safety of their attendees is at maximum. It is encouraged for organizers to work closely with school administrators to determine the most appropriate measures to take and ensure that the event is properly supervised. Organizers should also pay attention to liability issues that may arise. For this reason, most hackathons require students (and their legal guardian if necessary) to sign a liability waiver.

While intricacies of the registration process vary per hackathon, all hackathons bar unregistered individuals from entering the venue. Hackathons also log when students enter the event and verify that students are who they claim to be by checking their identification. Major League Hacking (MLH) encourages hackathons to collect all attendees' emergency contact information, including who to contact and how, in case of an emergency.

To ensure that a safe, comfortable, and inclusive environment is promoted, MLH encourages all events to require students to agree to the [Code of Conduct](#). This document illustrates the process for reporting violations and unsafe, harmful, or inappropriate behavior and fixing these problems as they arise. MLH has a no-tolerance policy for harassment and abuse, and employees work around the clock to ensure the environment at each and every hackathon is safe.

Who runs these hackathons?

Most Major League Hacking (MLH) events are run by student groups on campus. Students are tuned in to the needs of their peers and have the motivation to spend the time needed to plan an incredible event. Student organizers also have the ability to learn a lot about fundraising, management, logistics, and marketing through the process of planning a hackathon. However, students are not alone in their hackathon planning endeavors. MLH will help high school organizers by answering questions they may have, providing valuable advice, and connecting organizers to companies and vendors that they may need to work with.

Organizers also work closely with school administrators and faculty members to ensure the success of their hackathon. Frequent communication between the student-organizers and a school's administration is critical. It is also important for technology teachers to be involved with the planning of the hackathon and have a chance to interact with the professional developers who will attend the event.

Major League Hacking is the official student hackathon league. We organize the official hackathon seasons in North America and Europe and support the 50,000 student hackers who compete annually in student hackathons. [Backed by corporate sponsors such as Dell](#), we provide many resources for hackathon organizers to help ensure the success of their hackathons. Run almost completely by individuals with prior experience organizing hackathons and attending hackathons as developer evangelists for sponsoring companies, MLH ensures that student organizers are given expert help to guarantee the success of their event. Coming from backgrounds of organizing, participating, and sponsoring hackathons, MLH representatives are well-equipped to handle any challenges that they may face. By facilitating a link between the technology industry and collegiate education, MLH is able to help students reach companies and individuals that would not normally be corporate partners of on-campus events.

What does a hackathon look like from a student's perspective?

While hackathon schedules vary by event, most hackathons are run using a similar structure. A typical student's experience is illustrated below:

- **4:45pm:** Arrive at the venue and join the line to check-in.
- **5:15pm:** Reach the check-in booth. Hand the staff member your Student I.D., and receive a bag of branded t-shirts and stickers.
- **5:30pm:** Take your seat in the auditorium after talking to some students from a different school in the hall. Introduce yourself to the people seated in the row in front of you, and ask them what they are planning on building this weekend.
- **6:00pm:** The opening ceremony begins. Sit back and watch as the hackathon is kicked off and as sponsoring companies introduce themselves and discuss some of the latest technologies you can work with this weekend.
- **8:00pm:** The opening ceremony concludes. Attendees get up and start walking into the venue where a large amount of tables and chairs are set up.
- **8:05pm:** Put your backpack down on the first empty table you see, and introduce yourself to the students next to you. Learn they are looking for another member for their team, and tell them you are looking for a team. You do not yet know what you will be building, but now you have a team to build your project with.
- **8:15pm:** Begin to walk around the gym, and stop at every booth lining the walls. Each booth is run by company representatives, professional mentors, and recruiters. Talk to them about the technology they have expertise in and have

brought to the event. They also tell you about the prizes they will be awarding at the end of the hackathon.

- **8:45pm:** Dinner is served. Your team gets in line and gets a few plates of food. You all walk back to the original table with your food and sit down. It is time to brainstorm ideas.
- **9:00pm:** Over dinner your team creates a list of possible ideas but has yet to narrow it down. You know you are cutting into your hacking time, and decide to set up a deadline for making the decision. Your team has 30 minutes to decide on an idea.
- **9:30pm:** Finally! Your team has recognized a problem you all share, and decided to try to solve it. You have decided to make a better note-taking app, that displays information relevant to the topic you are learning about. Your team starts dividing roles into back-end development, front-end development, and design. You volunteer to work on the back-end of this app.
- **9:55pm:** Check the schedule and find that there is a Python Development Workshop starting in 15 minutes. Your teammates are “in the zone” and you do not want to disturb them, so you head off to the workshop.
- **10:00pm:** Get to the classroom for the workshop, and sit down in the front row. Again, you introduce yourself to the people around you and talk to them about the projects they are working on.
- **10:10pm:** The workshop begins. Take out your laptop to follow along, and create your first functioning website.
- **10:45pm:** The workshop concludes and you now have a website that says “Hello, World!” You wonder how you will make this website into a notetaking app.
- **11:00pm:** Upon returning to your table and picking up some snacks on the way, your team informs you that there is a Git workshop taking place to teach you how to work on a programming project with a team. Your team all attends this workshop and returns knowing an efficient way to work together.
- **12:00am:** Midnight pizza is served! You are making great progress on the server, but you take a quick break. So far, you have yet to encounter any big problems. There have been small problems but one of the other students at your table was able to help you fix it.
- **1:10am:** You have been stuck on one part of the program for about 30 minutes. It just is not working. You get up to take a break and walk around.
- **1:15am:** While walking around you encounter one of the professional mentors sitting at their booth. You tell them about your problem, and they offer to visit your table and take a look.
- **1:20am:** You and the mentor spend about 10 minutes going through your program. The mentor explains how the bug you are facing requires a relatively complex algorithm to fix it. The mentor offers to walk you through the fix, but you suddenly remember you learned this algorithm a few weeks ago in your computer science class. Thanking your mentor you sit back down and get to work.

- **2:30am:** Your teammate looks very puzzled, so you ask her what is wrong. You find out that she is facing the same problem you solved 10 minutes ago and tell her how to fix it.
- **5:00am:** Take a break for programming to participate in the cup-stacking tournament. Unfortunately, you do not win.
- **7:30am:** Breakfast is served.
- **11:00am:** It's crunch time! Your team frantically attempts to put the finishing touches on your project, and it is starting to look like a finished project. However, there are a lot of problems still to be solved.
- **11:30am:** Lunch is served!
- **11:45am:** Submit your project using the online submission form! Your team receives a table number. As your team packs up your stuff, you start to practice your pitch in your head. Walk over to the table you were assigned to set up the demo.
- **12:00pm:** The expo begins! Judges and other students walk around the giant venue as you and your teammates take turns demoing the app you built. People ask questions about the technology you used and about the idea. The more people that walk by and praise the app, the more excited you become.
- **1:30pm:** One of the celebrity judges approaches your table, and you ecstatically tell them what your app does. The judge is very impressed and scribbles some notes on his clipboard.
- **2:00pm:** The expos end, and you are directed to head to the auditorium where the closing ceremony will take place.
- **2:30pm:** The closing ceremony begins. Organizers talk about how much of a success this event was, and sponsors give prizes to their favorite projects. You do not win any sponsored prizes, but even that can't suppress your excitement.
- **3:00pm:** It is time to announce the top three hacks. As the crowd drumrolls, you hear the name of your app announced as the 2nd place winner! That means it is time to demo your app in front of the whole auditorium.
- **3:10pm:** The timer is set for three minutes and your team tells the audience all the features of your app. The crowd applauds and one of the organizers hands you and your teammates 2nd place medals and brand new phones.
- **3:30pm:** The hackathon concludes. You bid farewell to your new friends and exit the hackathon feeling more motivated than you ever have in your life. You cannot wait until you can sit down at a computer and continue to work on your app. Most of all, however, you cannot wait to sleep.