HudsonAlpha Institute for Biotechnology

Urban Engine

HudsonAlpha Tech Challenge (HATCH) 2021 Participant Guide

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The story behind HudsonAlpha Tech Challenge (HATCH)

Show off your skills & talents with the world's leading institution for biotechnology. Tackle biotech challenges using robotics, data visualization, hardware, design, and many other specialties. Inspire each other while building stories, code, design, and, most of all, YOUR ideas.

The HudsonAlpha Tech Challenge (HATCH), is a unique event for the community to take on challenges in life sciences using business strategy, software development, and technology.

HATCH 2021 will be virtual this year due to the COVID-19 pandemic. The health and well-being of program participants, HudsonAlpha employees, and campus residents is our top priority. To ensure everyone remains safe, HudsonAlpha made the decision to transition programs like HATCH to a virtual format.

The event will provide volunteer assistants and mentors (virtually) April 16-25 to help participants to solve biotech challenges, as needed.

About HudsonAlpha Institute for Biotechnology: HudsonAlpha Institute for Biotechnology is a nonprofit institute dedicated to developing and applying scientific advances to health, agriculture, learning, and commercialization. Opened in 2008, HudsonAlpha's vision is to leverage the synergy between discovery, education, medicine, and economic development in genomic sciences to improve the human condition around the globe.

About Urban Engine: Alabama's leading ideation accelerator known as the Urban Engine. Urban Engine's mission is to propel the growth of Alabama's economy by connecting aspiring entrepreneurs and established business leadership to educational resources, talent, and community. Urban Engine accelerates entrepreneurship, inspires innovation, and is building an inclusive community of ideators, creators, & innovators!

BELIEVE IN BIOTECH INNOVATION

Preparing for Participation in HATCH

What do you need to participate in the event?

You don't need much, but you do need a few handy tools:

- **Signed and uploaded media release form. (Located on Discord)**
- Computer with internet connection, chargers, & other relevant tech supplies.
- Software (**Hint:** Visit the event website for links to workshops and additional resources, https://hudsonalpha.org/techchallenge/resources.html)
- Discord and Twitch access. All live HATCH discussions and collaboration will take place on these social media platforms.
- Ideas

What kind of support is there?

There are a variety of tools that you can use. We recommend looking into all of the options available. Here is our list of strongly suggested resources for participants:

- **Join the public Discord channel** - This open forum messenger will be LIVE throughout the event for all your questions, concerns, and new friendly connections! Use this channel to find local teams, track all event announcements, or ask for help: https://discord.gg/gY73W8Vnnc
- **Team Assignments, Registrations, & Project Submissions -** Code for all projects should be sent to the main website's DEVPOST under an approved permissive open source license. Locate the DEVPOST link for uploading your project code on the HATCH competition website: http://hudsonalpha.org/techchallenge
- **Software, Development and Pitch Workshops -** A variety of workshops will be hosted by UrbanEngine for three weeks leading up to the event. You can find the workshop schedule and links to attend on the event website. If you missed any of the workshops you can catch the recordings on our Twitch channel.

HACKATHON TEAMS

Building Your Team Dynamics

A major focus of HATCH is *collaboration*.

As a participant, you can work as part of a team to build a project in response to one of the challenges or tackle the challenges on your own.

1. **Join the Community:** Before the hackathon begins you have the opportunity to meet and form teams with others who are interested in developing a solution to the same challenge that you are interested in. We encourage everyone with an interest in getting involved with HATCH to join the Discord here: https://discord.gg/DSE3gpgsGx .

2. **Team Formation:** We recommend that teams consist of 3-5 individuals. We encourage teams to look for a diverse set of skills and perspectives when forming teams. It is not necessary to be part of a team in order to register for the hackathon event.

   No technical experience necessary. Teams will need to include a diverse skill set -- project leaders, designers, artists, educators, writers, and anyone who wants to make a difference and address the challenges at hand. HATCH projects don't have to be apps and you don't need to be a programmer to participate. *In fact, most teams will benefit from having non-coders working with them!*

   MOCK TEAM MAKEUP
   2x Developers/Programers
   1x Front End Designer/Graphics Person
   1x In Charge of Marketing Pitch/Presentation

3. **Need help finding a team?** Participants seeking additional teammates are encouraged to join and post in the HATCH Discord channel.

4. **Team Registration:** Each team member will register on the official website hudsonalpha.org/techchallenge , create a profile on DEVPOST and contribute to the team page. Once invited, all team members will have the same rights to the team page.

5. **Online Support:** Review the published event schedule on the website for more information and be sure to keep communication open by posting on the HATCH Discord channel for team discussions.

DISCOVER THE LIFE SCIENCES

Challenges Overview

HudsonAlpha Institute for Biotechnology has published a short series of life science and biotechnology challenges for this hackathon competition. Teams of participants will work together to devise creative and innovative solutions to these challenges.

The overarching theme of the challenges are "Education, Genomics, & Biotechnology," underscoring the connections between major challenges and the potential solutions to them. Participants will collaborate to build open-source software, hardware, data visualization, and scientific platform solutions aimed at addressing these challenges. **Note:** *The projects don't have to be full apps - and you don't need to be a programmer to join!*

Challenge #1 - Woodland Champions

Little did you know that Alabama has over 140 state champion trees on the books and is home to four national champions. Exploring these incredible examples of nature's resilience is easy if all you want to do is see them. If you want to check them off your list of national treasures, you probably want a little more than a drive-by sighting. The Woodland Champions challenge is all about creating a beautiful app that helps the casual dendrologist get more information on trees of interest across the nation.

Challenge #2 - Signed, Sealed and Delivered

Sonia has a document that needs to be reviewed, approved, and signed by multiple members of her organization. She needs a system that will route the document to each of them in turn and record their approval and signature. Once a recipient approves and digitally signs the document, the system then routes it to the next person on the list. When all recipients have approved and signed, a notification is sent back to Sonia letting her know the document has been approved by all recipients. In this challenge, you will create a certificate authority system by which documents can be secured, tracked, edited and signed all by multiple individuals.

Challenge #3 - Make it Pop!

Pouring through spreadsheets of data to pick out individuals that might be at risk of breast and ovarian cancer even without a known genetic risk factor sounds like something you might hire an intern to do. In fact, it requires some pretty specialized skills to determine what family history indicators might make someone more at risk than another. Genetic counselors are excellent at finding these, sometimes nuanced, indicators but are limited on time. This challenge requires the development of an AI that can not only find those individuals that may be at risk but learn as it goes to build a more robust risk model based on both genetic and family history data.

HATCH SCHEDULE OF EVENTS

Important Dates and Times

Friday 4/16

HATCH Challenge Kickoff Ceremony — Live on Twitch

Opening Remarks	4 pm - 5:30 p.m.
Team Matchmaking	5:30 pm - 6 p.m.
HATCH 2021 Officially Begins	6 p.m.

Wednesday 4/21

Mid-Point Check-In, 5 - 5:30 p.m. — Live on Twitch

Reminders & Special Guests

Sunday 4/25

Code Freeze and Project Submissions, 5 p.m.

Sunday 4/25

HATCH Closing Ceremony 5 - 5:30 p.m. — Live on Twitch

Sunday 5/2

HATCH Winners Announced. 5 - 5:30 p.m. — Live on Twitch

PARTICIPATION REQUIREMENTS

General Rules & Participant Eligibility

This is a public event and media may be captured during the event including hackathon activity, ideation processes, speakers, workshops and interviews with participants in various media including written, photographic and video. Some content captured may be broadcasted and used for promotional purposes by HudsonAlpha and its event collaborators. Participants must sign all legal and media waivers.

Please sign & upload the Media Release Form to Google Drive ASAP.

Participant Code of Conduct: HATCH is a place to learn something new and build something fun. All participants are expected to follow these three principles:

1) Act in a way that displays yourself as a positive role model.
2) Be humble, even when you're successful.
3) Be friendly and welcoming. Respect, encourage and support other participants.

More specifically, you will be expected to:

- Be welcoming to new people joining your team.
- Ensure the safety of yourself and other participants.
- Abstain from using sexual language or imagery.
- Do not insult or harass others. Abstain from using offensive language referring to people's gender, sexual orientation, religion, race, ethnicity or age.

CODE OF CONDUCT

Harassment includes offensive verbal comments related to gender, gender identity and expression, age, sexual orientation, disability, physical appearance, body size, race, ethnicity, nationality, or religion, sexual images in public spaces, deliberate intimidation, stalking, following, photography or audio/video recording against reasonable consent, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome sexual attention.

Photography is encouraged, but other participants must be given a reasonable chance to opt out from being photographed. If they object to the taking of their photograph, comply with their request. It is inappropriate to take photographs in contexts where people have a reasonable expectation of privacy (in bathrooms or where participants are sleeping).

Participants asked to stop any harassing behavior are expected to comply immediately.

As this is a hackathon, we like to explicitly note that the hacks created at HATCH are equally subject to the anti-harassment policy.

Sponsors and partners are also subject to the anti-harassment policy. In particular, sponsors should not use sexualized images, activities, or other material. Sponsor representatives (including volunteers) should not use sexualized clothing/uniforms/costumes, or otherwise create a sexualized environment.

If you are being harassed, notice that someone else is being harassed, or have any other concerns, please contact a member of the HATCH volunteers immediately. HATCH volunteers will be happy to help participants contact any local security or local law enforcement, provide escorts, or otherwise assist those experiencing harassment to feel safe for the duration of HATCH.

If a participant engages in harassing behavior, HATCH organizers may take any action they deem appropriate. This includes warning the offender, expulsion from HATCH with no refund (if applicable), or reporting their behavior to local law enforcement.

We expect participants to follow these rules throughout the duration of HATCH, on all digital and social platforms, during the collaboration process, and at workshops and any other HATCH related social events.

For questions, concerns or to report an issue, please contact:

Alex Cate (he/him), acate@hudsonalpha.org, 256-783-2240
Emily Kelley (she/her), ekelley@hudsonalpha.org, 256-527-7322
Kristina Keogh (she/her), kkeogh@hudsonalpha.org, 509-671-0062

HACKATHON RULES

Project submission, Judging & Awards

As a participant at HATCH, you can work as part of a team or individually.

Team Registration & Project Submissions

Each team (or individual participant) will create a project page on DevPost to describe their work and submit their solution. Project pages can only be updated during the virtual hackathon period of April 16-25, 2021.

- ❏ **Participant Eligibility Summary:** All members of the team must sign up for the event online via Eventbrite Registration AND the Official DEVPOST website in order to participate. Teams can be any size, however, a maximum of 5 people per team will qualify for prizes if they win. The smallest team can be 1 person. *High school teams must have only high school members as participants.*

- ❏ **Code & Project Submissions:** We utilize DevPost to manage project submissions for Judges. All projects (Code & Video Presentations) must be submitted before 5:00pm on Sunday, April 25. IMPORTANT: See "Judging Eligibility" section for full details on submission and requirements.

Once registered you will need to do the following:

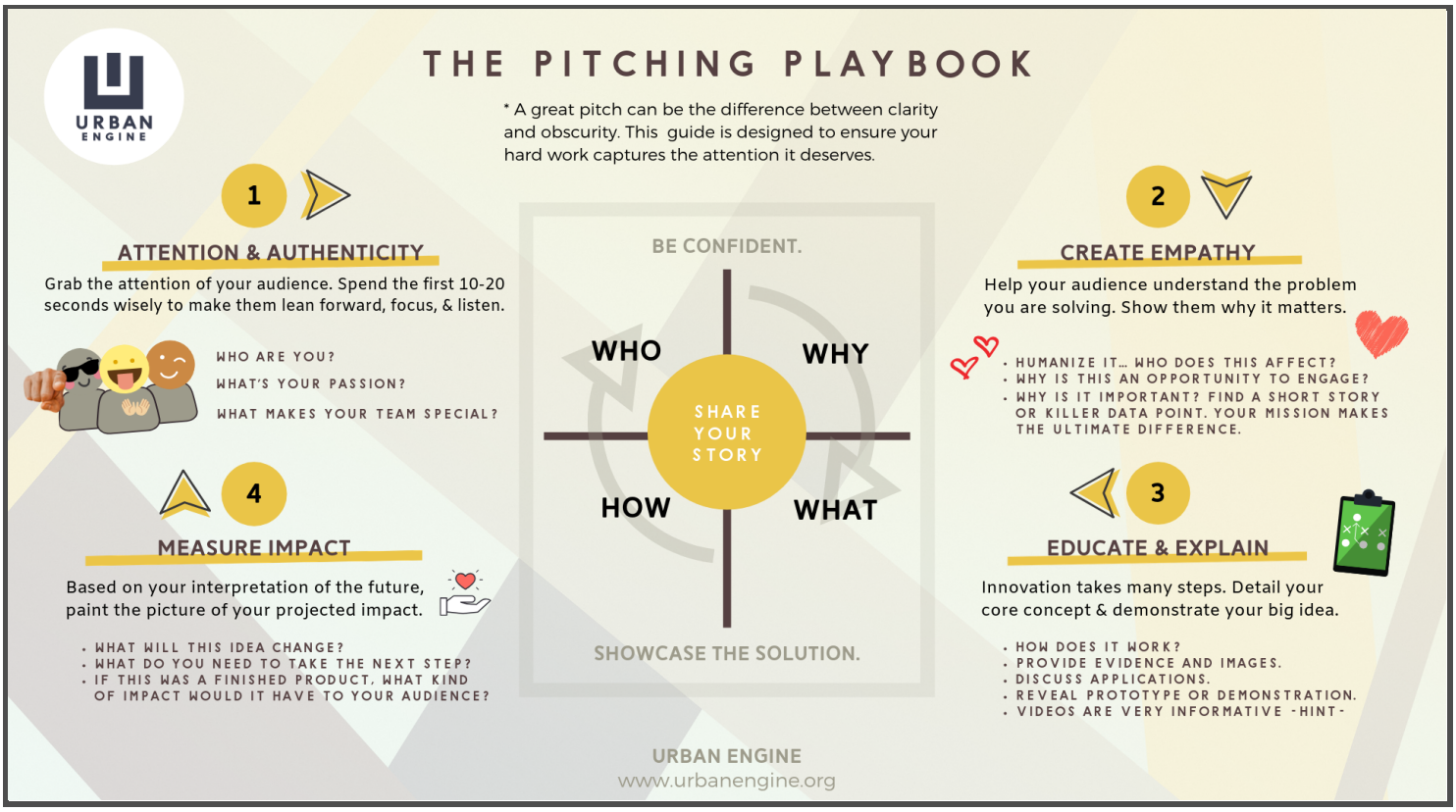
Register for HATCH in DevPost. Once your DevPost account is created, you will be able to create project pages. Next, create a DevPost project page for your HATCH project - you can do this via the **[Enter a submission]** button on the HATCH page, or via your Portfolio in DevPost. **You must identify the division you are competing in for the challenge on the team Devpost Project Page. Teams that do not self-identify division will default to the Professional Division of the Challenge.** Lastly, submit your DevPost project to HATCH.

When creating and editing your DevPost project make sure you:

- Invite your team members onto the project via email.
- Describe your project thoroughly in the "Here's the whole story" section. Use Markdown for this; check out this Cheatsheet for a quick introduction to Markdown formatting.
- Put the links to your app's source code repository in Github. Put the links to your app and other resources in the "Try it out" field. You can add multiple links. Upload images, such as screenshots, in the "Image Gallery".
- Paste your shareable URL to the Google Slides presentation. Make sure permissions are public.
- Check out these video instructions from DevPost: https://www.youtube.com/watch?v=vCa7QFFthfU

Pitching Your Solution

Manage your time wisely! Review the full event schedule and follow this nifty diagram on how pitches will work. Each team has 5 minutes to pitch their solutions via a short video. Unlike previous years, your video will be the final submission for HATCH. There will NOT be a live pitch. So, make sure your video fully explains your technology!



Judging Project Submissions

Teams will be judged on their solutions generated on the HudsonAlpha DEVPOST website.

Judging Eligibility

The competition is organized into two divisions: high school and professional (open). The majority of the team's membership must come from the division where the team is competing. High school teams must have only high school members as participants.

- Participants must sign up for the event online via Eventbrite Registration AND the Official DEVPOST website in order to be eligible to participate in the event. All participants must sign all of the required media waivers in order to participate.
- All code and project development must be created during the virtual hackathon period by registered members in the event. Code that is worked on outside of this scope will not be qualified for awards.
- All source code must be submitted under a permissive open source license. A qualifying permissive open source license is one of the following: Apache 2.0, MIT, or BSD 3-Clause.
- If the solution is software-based code, then use of design mockups or wireframes is allowed during videos. However, judges prefer to see functional working software/apps and will judge accordingly.
- Use of open source libraries are allowed as long as the project is publicly available. Contact our team for Q&A support.
- A five-minute video describing/demoing the project is required. While professional equipment and production elements are not required, teams do need a means to create the video (ex. A smartphone will do just fine)
- The project's source code must be publicly accessible via github for a week after the end of the event.

Judging Process

Projects submitted on the DEVPOST website will be evaluated according to the following steps:

- Judging will be done in two rounds: An opening round based on submitted materials by a preliminary judging panel and a second round by finalist judges based on first round scores. Judges will select winners through an initial evaluation of project solutions by code, written overview, and short video as submitted to the DEVPOST website.
- Teams will produce and deliver a no-more-than **5 minute YouTube video** detailing the project solution. The associated link must be posted along with code and other materials.
- Teams will produce a **short written overview** (template provided on the DEVPOST site)
- Unlike in previous years, judges will solely judge on the team's video, submitted code and written overview. - **Make sure your video accurately reflects your work, what you learned, and how you attempted to solve the challenge!**

Judging Criteria

Projects will be evaluated based on a score range of 0 to 5, following the criteria outlined below.

Impact	Does this solution address the problem in a highly significant way? How well does this project fit the needs of the challenge the team chose to tackle? How user-friendly is the technology? How fully formed/mature is the idea?
Creativity	How creative is the team's approach? Is the solution new? Does the break new ground (i.e. represent something that isn't being addressed by the market)? Does the project break from established design?
Complexity	How much progress did the team make during the event? Did they start from scratch or build on an existing solution? Is the solution complete and sufficiently complex to address the problem?
Product	How user-friendly is the technology? How fully formed/mature is the idea? Can it be a "product"? Can it be extended into a bigger product or system (growth potential)?
Presentation	Did the team effectively communicate their solution? Did they tell the story of the project and why it is important in a compelling way? How well did they respond to questions from judges (live pitch only)?

Award Winnings

Only five members of a team will qualify for prizes. It's up to your team to figure out how winnings will be distributed. Winners must sign the appropriate forms, provided after the award ceremony.

Grand Prize & HATCH Awards

These awards are selected according to HATCH judging criteria. Winners may also be eligible for mentorship through the HudsonAlpha Navigate mentorship program. Only US residents are eligible for the cash prizes.

Professional		High School	
1st Place	$2,000	1st Place	$1,000
2nd Place	$1,000	2nd Place	$500
3rd Place	$500		

FREQUENTLY ASKED QUESTIONS

Please contact us with additional questions/concerns.

1. What is a tech challenge?

The HudsonAlpha Tech Challenge (HATCH) is an event in which people learn and create. Teams take on exciting challenges in biotech and attempt to solve those challenges through innovation and creativity. During the event, participants will have the opportunity to learn more about some of the new frontiers in biotech, and work collaboratively to create solutions.

2. Who can participate?

High school students, college students and adults interested in taking on challenges are welcome! There are two categories of teams: high school and college/adult.

3. I don't have a team but I would like to participate. Now what?

It is not necessary to be a part of a team entering HATCH. We have set up a discord to assist with connecting individuals interested in participating on a team to others. You can join here: https://discord.gg/gY73W8Vnnc. You also can choose to work independently - but hackathon participants say half the fun is the collaboration and creativity that occurs within a team dynamic!

4. Where will it take place?

HATCH will take place 100% virtually! Presentations will happen live on Twitch (https://www.twitch.tv/hudsonalphatechchallenge) while communication and collaboration will take place in our Discord channel: https://discord.gg/gY73W8Vnnc.

5. Why are you hosting this event?

Good science comes from a solid background of knowledge, creative ideas, and the ability to work with data. Increasingly, science problems are being solved through the application and manipulation of big data. HATCH is a great opportunity to introduce the coding community and students to genomics, genetics and the future of biotechnology.

6. Does it cost money?

This event is $10 per participant. This covers entry fee, t-shirt, swag, and more. Scholarships are available if financial assistance is needed. Simply email us to let us know at: techchallenge@hudsonalpha.org.

7. What is genomics and biotech?

Simply put, biotechnology uses biological processes (organisms, proteins, enzymes, genes) to create or enhance products that impact life. Modern biotechnology is powered by our understanding of DNA: specifically how genetic instructions create the building blocks of life and that changes in those DNA instructions alter physical characteristics associated with human health, agriculturally important plants and livestock and bio-based sources of energy. Today's technologies generate enormous amounts of genetic information, requiring new tools to organize, analyze and visualize this data.

8. What if I don't know anything about biotech, genetics, or writing code? Can I still participate?

Absolutely! Learning is a big component of HATCH. We offer workshops on the science to get you up to speed. The challenges will require a variety of skill sets, so if writing code isn't one of yours, don't worry! Mentors will be available throughout the event to offer advice and answer questions.

10. I'm stuck on my project. What can I do to find help?

Throughout the event, event organizers will facilitate office hours on the HATCH Discord to answer questions and help coach participants through challenges they may face throughout the hackathon. If you find yourself stuck overcoming a development challenge or don't know where to turn for help understanding subject matter, we suggest bringing your questions during this time.

11. I have a great idea for how to solve a challenge but I don't know how to develop it. Can I hire help?

In short, no. Submissions are required to be developed in whole by registered participants in the hackathon who are working in collaboration on the development of projects that provide a solution to a HATCH challenge. Individual participants or teams that solicit professional assistance in exchange for payment as a contribution to their submission will be disqualified from HATCH judging and prizes.

12. What is Urban Engine?

Urban Engine is an Alabama non-profit organization that propels ideas forward. We serve small business, startups and the tech community through the facilitation of our innovation programming including CoWorking Night, 32/10 Speaker Series, Hackathons, Pitch Competitions and OpenHuntsville.com. Urban Engine's mission is to propel the growth of Alabama's economy and accelerate STEAM innovation by connecting aspiring entrepreneurs and established business leadership to educational resources, talent, and community.

13. I still have a question. Who can I contact?

Please email: techchallenge@hudsonalpha.org

TOOLS & RESOURCES

Urban Engine has curated some free resources for all hackathon participants in collaboration with the Technical Team from HudsonAlpha Institute for Biotechnology. Consider using these contextual tools and resources for competing in the event.

DEVELOPER RESOURCES	
Data Science	The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations, and narrative text. Uses include data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more. Power BI is a business analytics service from Microsoft. It aims to provide interactive visualizations and business intelligence capabilities with an interface simple enough for end-users to create their own reports and dashboards. HSV.AI presentation on classifying MUSK using machine learning: https://github.com/HSV-AI/presentations/tree/master/2019/190213
Game Engines and 3D Graphics Editors	Blender is a free open-source 3D modeling system with a supportive development community. A Support web page is a good starting point to find tutorials and communities. Search YouTube for Blender tutorials. Unity is a popular commercial game engine that includes an interactive development environment; it's free for personal use. ThreeJS is a free 3D graphics code library for Javascript. With ThreeJS, you can develop interactive 3D models and embed them within a web page. X3dom is another 3D graphics code library that enables the development of embedded 3D models in a website. Explore the examples and tutorials to get ideas on how to apply the library. The scene authoring API provides additional details about producing interactive objects.
Virtual Reality Hosting Platforms	Among the many services provided by Amazon AWS is Sumerian, which is a 3D graphics development system for creating and deploying interactive 3D models. Sketchfab offers free hosting of interactive 3D models and it supports WebVR, which enables use of VR headsets. JanusVR is a virtual reality browser that provides tools for 3D graphics systems, such as Blender, Unity, and Unreal. Also, with the JanusVR Markup Language (JML), you can interactively build VR worlds online. An interactive online editor enables you to experiment with commands to build objects within a virtual world.

TOOLS & RESOURCES (cont.)

DEVELOPER RESOURCES	
Hosting Platforms	Firebase is a mobile and web app development platform developed by Google that provides developers with a plethora of tools and services to help them develop high-quality apps, grow their user base and earn more profit. Heroku is a cloud platform service supporting several programming languages. Heroku, one of the first cloud platforms, has been in development since June 2007, when it supported only the Ruby programming language, but now supports Java, Node.js, Scala, Clojure, Python, PHP, and Go. Amazon Web Services (AWS) is a subsidiary of Amazon that provides on-demand cloud computing platforms to individuals, companies and governments, on a paid subscription basis. The technology allows subscribers to have at their disposal a virtual cluster of computers, available all the time, through the Internet.
Frameworks and Tools	Visual Studio Code (VSCode) is a source code editor developed by Microsoft for Windows, Linux and macOS. It includes support for debugging, embedded Git control, syntax highlighting, intelligent code completion, snippets, and code refactoring tools. React is a JavaScript library for building user interfaces. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. Django is a Python-based free and open-source web framework, which follows the model-view-template architectural pattern. Django's primary goal is to ease the creation of complex, database-driven websites. Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. .NET Framework is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large class library named Framework Class Library and provides language interoperability across several programming languages. Ionic is a complete open-source SDK for hybrid mobile app development built on top of Angular and Apache Cordova. React Native is a JavaScript framework for writing real, natively rendering mobile applications for iOS and Android. React Native also exposes JavaScript interfaces for platform APIs, so your React Native apps can access platform features like the phone camera, or the user's location.