

# THE BYTE



DEPARTMENT OF COMPUTER  
SCIENCE & ENGINEERING



JULY 2019

IMS ENGINEERING COLLEGE

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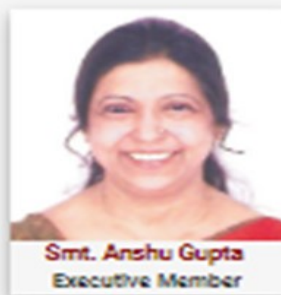
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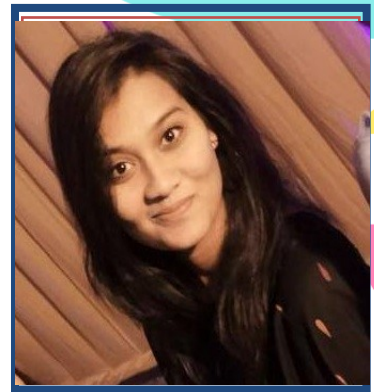
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# VISION/MISSION OF INSTITUTION AND DEPARTMENT

**Institut Vision:** Our vision is to impart vibrant, innovative and global education to make IMSEC the world leader in terms of excellence of education, research and to serve the nation in the 21<sup>st</sup> century.

## **Institute Mission:**

- To develop IMSEC as a centre of Excellence in Technical and Management education.
- To inculcate in its students, the qualities of Leadership, Professionalism, Executive competence and corporate understanding.
- To imbibe and enhance Human Values, Ethics and Morals in our students.
- To transform students into Globally Competitive professionals.

**Department Vision:** To be recognized as a Centre of Excellence imparting quality education and creating new opportunities for students to meet the challenges of technological development in Computer Science & Engineering.

## **Department Mission:**

- To promote technical proficiency by adopting effective teaching learning processes.
- To provide environment & opportunity for students to bring out their inherent talents for all round development.
- To promote latest technologies in Computer Science & Engineering and across disciplines in order to serve the needs of Industry, Government, Society and the scientific community.

To educate students to be Successful, Ethical and Effective problem-solvers and Lifelong learners who will contribute positively to the society.

# PROGRAM EDUCATIONAL OBJECTIVES

*Graduates of the program will be able to apply fundamental principles of mathematics, engineering, management, basic programming languages in problem understanding & formulating its solutions. They will be aware of the role of computing in multiple disciplines.*

- Graduates will learn to apply the principles of advanced computer programming & approaches, software engineering, project management, emerging techniques & tools while developing real world computational solutions and projects. Graduates should also learn to collaborate & apply innovative aspects in problem solving.*
- Graduates will enhance their technical, aptitude, communication & professional skills through value addition programs, project based learning, engineering events, self-learning, research, interaction with industry & alumni. Help our graduates to establish a productive Computer Science and Engineering career in Industry, Government or Academia.*
- To promote the understanding of professionalism, ethics, social responsibilities among graduates. They will contribute to the society through active engagement with professional societies, schools, civic organizations or other community activities. To promote professional capabilities through lifelong learning.*

# PROGRAM SPECIFIC OUTCOMES

- *Student should learn to demonstrate the basic understanding of Computer Science & Engineering fundamentals, programming, and professional/social ethics and apply mathematical foundations to design & solve computational problems.*
- *Student should learn to apply analysis, design, development, testing & management principles in the development of computational solutions & software systems; He/she is expected to function effectively in development teams.*
- *Student is expected to gain enough value addition and technical expertise on latest industry specific skills through self learning & training. They are expected to have good communication skills with correct attitude and aptitude.*
- *Students are expected to inspire for lifelong learning & do well in their professional careers. They are also expected to act as a good citizen by inculcating in them moral values & ethics.*



It is with immense happiness that we place in the hands of our readers this edition of 'THE BYTE'. This magazine is a platform that exhibits the literary skills, innovative ideas of teachers and students. It was crazy when we stated it but when it all come together, we were more than happy.

We express our considerable appreciation to all the authors of the articles in this magazine. These contributions have required a generous amount of time and effort. It is this willingness to share knowledge, concerns and special insights with fellow beings that has made this magazine possible. We hope you enjoy reading these articles, as seen through the IMS student's journalistic eye.

Thank you all!!



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# ARTICLES

# History of India's Independence

Over the course of history, India has faced several invasions. While most of the invaders made their intentions clear right from the word go, the British managed to bring India under their control through a business venture. It all started with the British East India Company, which



started off as a mere joint-stock company, but slowly went about spreading its wings and influence, before the British government finally took control of the entire country.

The British company had landed in India in the early seventeenth century as traders, but began interfering in Indian affairs around 1750s. After the battle of Plassey (1757), it began to transform from a trading company to a ruling force. As the British began to spread their tentacles over a large part of India, the exploitation of local resources and people began in full force. The British were concerned just about consolidating their rule and power.

The British rule had a damaging effect on the social, economic, cultural and political life of Indians, which gradually forced common masses and rulers to rise in revolt against the British rule. Several agrarian, tribal, and political rebellions broke out against the foreign rule, but it was the rebellion of 1857, which proved as a launch pad for all the subsequent struggles against the British rule. The continuously increasing awareness, contact with the outside world, and the urge to free the motherland, gave rise to an organized movement by the end

of the nineteenth century, which uprooted the 200-year-old British rule in 1947.

## The History of British Colonialism in India

After the fall of the Mughal Empire, the British gained the support of many local rulers by offering them help against their adversaries. Since the British were equipped with huge cannons and newer war technology their support proved helpful to many Indian rulers. In exchange for their support, the East India Company managed to set up trading centers in places like Madras, Calcutta and Bombay. The British gradually started to extend their fortification. When they were asked to stop their extension by Siraj-ud-daulah, the Nawab of Bengal, they defeated him in the Battle of Plassey (1757). This win against Siraj-ud-daulah played a crucial role in colonizing the whole of India.

## Early Rebellions Against the British Rule

For their short-term benefit, many Indian rulers supported the British colonization in India, but many of them opposed the idea of foreign rule. This created a conflict between Indian rulers, which was further used by the British to their advantage. Among the early rebellion, South Indian rulers, such as Puli Thevar, Hyder Ali, Tipu Sultan, Pazhassi Raja, Rani Velu Nachiyar, Veerapandiya Kattabomman, Dheeran Chinnamalai, Maruthu Pandiyar, etc. revolted against the British and fought several wars and battles.



Many rulers like Hyder Ali and Dheeran Chinmalai sought the help of Maratha rulers in their fight against the British.

Agitated by the ill-impact of the British rule on the social, cultural, tribal, and economic fabric of society, many individuals like Sidhu Murmu, Kanhu Murmu and Tilka Manjhi stood up against the British colonization.

While the British managed to defeat bigger ruler like Tipu Sultan via local alliances (supporting one ruler against the other), they did not have much difficulty in suppressing local agrarian



and tribal rebellions. The British not only used better weapons, but they also resorted to devious tactics like the 'divide and rule policy' in to consolidate their rule and might.

Even though the British tried their best to suppress rebellions across India, these revolts would not stop as the British not only subjected people to a foreign rule but also exploited people economically.

### **The Revolt of 1857**

Often referred to as the 'First War of Indian Independence,' the revolt of 1857 was the result of a series of incidents, but the immediate reason for the revolt was the issue of 'greased cartridges.' The East India Company mistreated the Indian soldiers and discriminated between the Indian and the European soldiers. While the soldiers knew that the British were using factors like religion and caste against them, the news of the newly introduced Enfield P-53 rifles using cartridges made out of fat extracted from beef and pork sparked a widespread rebellion against the British. Since the soldiers had to bite the cartridge in order to load the rifle, it did not go down well with the Hindu and Muslim soldiers as it hurt their religious belief. Since con-

suming beef and pork is against the religious beliefs of Hindus and Muslims respectively, the allegation convinced Indian soldiers that the British were trying to convert them into Christians.

This, along with many other factors, played a crucial role in the revolt of the soldiers. Many Indian rulers from different states followed suit and locked horns with the British. At the end of it all, at least 800,000 people, including many civilians, were killed. As a result of the rebellion, the British government took control of the administration of India from the East India Company.

### **Organized Movements**

The revolt of 1857 was the first large-scale rebellion against the British rule, and inspired the future generation to fight for the independence of the motherland. Slowly and gradually many organizations were formed that started to demand for some sort of self-governance and rights for Indians.

In 1867, Dadabhai Naoroji founded the East India Association, while Surendranath Banerjee came up with the Indian National Association in 1876. With more and more people coming up with the demand for more rights, several prominent people came forward and decided to form a platform that will demand for self rights and self governance. It led to the formation of the Indian National Congress in 1885.

Since the British failed to grant even the moderate demands set by the Congress, many Indians started questioning the moderate leaders of the Congress, and advocated more radical approach in dealing with the British, which gave rise to several revolutionary organizations that advocated use of force and violence. Works done by socio-religious groups like Brahmo Samaj and Arya Samaj played a crucial role in creating awareness among Indians. The works of reformers like Swami Vivekananda, Rabindranath Tagore, V. O. Chidambaram Pillai and Subramanya Bharathy evoked a sense of nationalism among Indians.



## The Rise of Nationalism

Radical leaders like Bal Gangadhar Tilak straightway pushed for self-rule for Indians. Tilak was also saddened by the fact that the education system of the British government did not portray India's history and culture in a positive light.

He advocated complete freedom (Swaraj) and managed to inspire many Indians with his famous slogan, "Swaraj is my birthright and I shall have it." He was joined by other like-minded leaders like Bipin Chandra Pal and Lala Lajpat Rai. The trio together came to be known as 'Lal-Bal-Pal,' but they were expelled from the Congress for advocating violence and disorder.



However, they had done enough to instill nationalism into the minds of thousands of Indians.

## The Partition of Bengal

Since pre-independent Bengal was as big as France in terms of its geography, the then Viceroy and Governor-General, Lord Curzon, ordered the partition of Bengal in 1905. He argued that the partition would lead to a better administration and ease the rising conflict between the Hindus and the Muslims.

The Indian nationalists, however, believed that the move was an attempt to slow down the momentum gathered by the recent nationalist movements. They also believed that Lord Curzon was employing the divide and rule policy to create a rift between Hindus and Muslims. This led to a large-scale protest against the British rule, including boycotting British products and publications of several rebellious newspapers and articles. The government was eventually forced to reunite Bengal in 1911. But a new partition, based on the languages spoken, was created soon after. The partition of Bengal left an indelible mark on the people and political scenario of Bengal.

## The Rise of the Muslim League

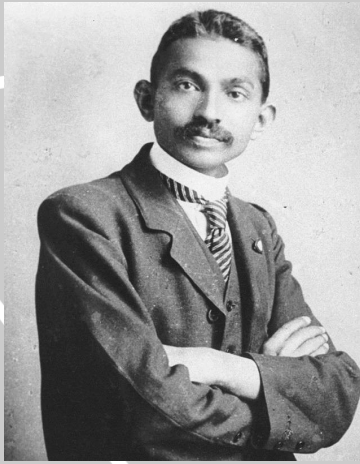
In 1886, Syed Ahmed Khan, an Islamic reformist and philosopher, founded the All India Muhammadan Educational Conference. The conference was set-up in an attempt to provide quality education to Indian Muslims. The conference organized annual meetings to discuss various methods to improve the quality of education, among other things. In 1906, during the 20th session of the conference, the members decided to set up a political party called the 'All India Muslim League.' After the creation of the All India Muslim League, the party strived towards achieving equal civil rights for the Muslim population in India. Slowly and gradually, the Muslim league started to propagate the theory that the Indian National Congress was a -Hindu outfit, and that the political party was incapable of ensuring equal rights for the Muslim community in India. This belief found many takers, and slowly and gradually more and more Muslim leaders started contemplating the idea of creating another political entity where Muslims would form the majority.

## National Movement & the First World War

The national movement started picking-up at the end of the nineteenth century and by the turn of the new century it had gathered a critical mass, which would propel it further in the coming years. More and more people were joining hands with nationalist leaders and the Congress to raise the demand of self-rule. Led by leaders like Lala Lajpat Rai, Bal Gangadhar Tilak, Bipin Chandra Pal and V. O. Chidambaram Pillai, more and more commoners began to protest against the British government.

Though the Indian National Congress was still advocating the importance of the British rule, people had begun to participate in mass movements, which inspired others as well. Meanwhile, just before the beginning of the First World War, the British government had promised special benefits to India support during the First World War. As many as 1.3 million Indian soldiers were sent to places like the Middle East, Europe and Africa to fight for the British in the First World War. Also, many individual rulers of different princely states supported the British by sending large supplies of money, food and ammunition.

## The Arrival of Mahatma Gandhi



Gandhi had mastered the methods of civil disobedience through non-violent means in South Africa, where he worked as a barrister. In 1914, many political prisoners were freed by General Jan Smuts, thanks

to Gandhi's non-violent protests. Impressed by his methods, a prominent leader of the Indian National Congress Gopal Krishna Gokhale requested Gandhi to return to India and join the national movement. Upon his arrival, Gandhi joined the Indian National Congress and accepted Gopal Krishna Gokhale as his mentor. He then went on to establish Satyagraha ashram and led a Satyagraha campaign in 1917. For the



next three years, Gandhiji led many non-violent protests that included Satyagraha and

fasting. The Kheda Satyagraha and the Champaran satyagraha were some of the early movements where he applied the concept of Satyagraha to fight for the rights of farmers and other peasants.

## The Non-Cooperation Movement

In 1919, Brigadier-General Reginald Dyer ordered to shoot at a peaceful gathering of men, women and children in Jallianwala Bagh, who had gathered to celebrate Baisakhi and to condemn the arrest of Dr. Saifuddin Kitchlew and Satya Pal. This inhuman act of the British sent shockwaves across India, and received strong criticism and protests all over India. Mahatma Gandhi too denounced this cowardly behavior and strongly condemned it.

The national movement was slowly building-up and the Jallianwalah Bagh incident played an important role in the start of the 'Non-

cooperation Movement.' It was the first big Satyagraha movement under Gandhi's leadership. He requested the support of other political and religious leaders and gave a call to Indians to stop using British products.

Gandhiji advocated the use of Khadi over British textiles. He also asked government servants to quit their jobs, and return the British titles and honors. Many Indians refused to pay taxes and many teachers and lawyers gave up their respective profession. The non-co-operation movement became a huge success throughout India until it was called off by Gandhiji in the wake of the Chauri Chaura incident, in which three civilians and 22 policemen were killed.

The Non-cooperation movement had seen an unprecedented and large-scale participation from the people of all regions and status. The entire country was transformed into a different zone and the protests were largely successful, but the unfortunate incident at Chauri Chaura forced Gandhi to call the movement off. He said that people were still not ready for mass-movements of this nature.

The decision to call-off the non-cooperation movement left many disappointed and was criticized by several leaders.

## Revolutionary Movement & its Role in Freedom Movement

While the Indian National Congress, led by leaders like Gopal Krishna Gokhale and Mahatma Gandhi, advocated civil disobedience and non-violent protests, many firebrand leaders believed in overthrowing the British with the use of force. The revolutionary movement had begun as early as the late 1750s, but it was during the Partition of Bengal that it began to take shape. Under the leadership of Barin Ghosh, many revolutionaries began to collect arms and explosives. They even started manufacturing bombs and some were even sent to foreign countries to acquire knowledge about bomb-making and other military training. By 1924, Hindustan Republican Association (HRA) was formed and firebrand revolutionaries like Chandrashekhar Azad, Bhagat Singh, Ashfaqullah Khan, Ramprasad Bismil, Shivaram Rajguru, Surya Sen, etc. began to involve themselves in various revolutionary activities. Some of the famous revolutionary activities include Anjole bomb conspiracy, Chittagong armoury raid, Kakori train robbery, Delhi-Lahore conspiracy case, etc.





### **Azad Hind Fauz**

Subhas Chandra Bose quit the Indian National Congress and travelled to many countries to seek help for India's independence. Bose wanted to raise an Indian army to fight against the British. Based on Hitler's advice, he went to Japan and formed the Indian National Army (Azad Hind Government). During the Second World War, the Indian National Army managed to capture Andaman and Nicobar islands with the help of the Japanese army. However, the setback to Japan in the Second World War impacted the prospects of the INA as well and its march was blocked on the border and many soldiers and officers were arrested.

### **Quit India Movement**

As the World War II progressed, Mahatma Gandhi intensified his protests for the complete independence of India. He drafted a resolution calling for the British to Quit India. The 'Quit India Movement' or the 'Bharat Chhodo Andolan' was the most aggressive movement launched by the Indian National Congress. Gandhi was arrested on 9th August 1942, and was held for two years at the Aga Khan Palace in Pune. The Quit India Movement came to an end by the end of 1943, when the British gave hints that complete power would be transferred to the people of India. Gandhi called off the movement which resulted in the release of 100,000 political prisoners.

### **Partition & Independence of India**

Though prominent leaders like Mahatma Gandhi and Jawaharlal Nehru were not willing to accept the formula of partition based on religion, but communal clashes between religious groups hastened the creation of Pakistan. The independence cum partition proposal offered by the British Cabinet Mission in 1946 was accepted by the Congress. Sardar Patel convinced Gandhi that it was the only way to avoid civil war and the Mahatma reluctantly gave his consent. The British Parliament passed the famous Indian Independence Act 1947, and on August 14, Pakistan was declared a free nation. Few minutes later at 12:02 am, India became a democratic nation, much to the joy and relief of the entire Indian subcontinent. After India's independence, Gandhiji focused on peace and unity among the Hindus and Muslims. He began a fast-unto-death in Delhi, asking for all communal violence to be topped and the payment of Rs. 55 crores, as per the Partition Council agreement, to be made to Pakistan. Ultimately, all political leaders conceded to his wishes. The Constituent Assembly was given the responsibility of creating the constitution. Headed by Dr. B.R. Ambedkar, the constitution was adopted on 26 November 1949. On 26 January 1950, the Constitution of India came into effect.



# Latest Technological Research



## AI tool characterizes a song's genre and provides insights regarding perception music

An artificial intelligence tool can characterize a song's genre and provides increased understanding how we perceive and process music. Applications include how music content is marketed, consumed and tagged; neuropsychology and the mechanisms of human thought; and affective computing systems that impact human emotions.

## Seeing how computers 'think' helps humans stump machines and reveals AI weaknesses

Researchers have figured out how to reliably create questions that challenge computers and reflect the complexity of human language through a human-computer collaboration, developing a dataset of more than 1,200 questions that, while easy for people to answer, stump the best computer answering systems today. The system that learns to master these questions will have a better understanding of language than any system currently in existence.

## Quantum computers to clarify the connection between the quantum and classical worlds

A new algorithm will allow quantum computers to investigate how the classical world we experience emerges from the quantum world, and test other foundational issues in quantum mechanics.

## New technique uses power anomalies to ID malware in embedded systems

Researchers have developed a technique for detecting types of malware that use a system's architecture to thwart traditional security measures. The new detection approach works by tracking power fluctuations in embedded systems.

## Artificial intelligence helps banana growers protect the world's most favorite fruit

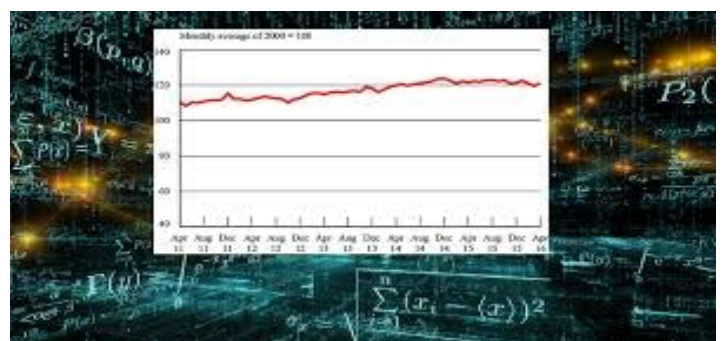
Using artificial intelligence, scientists created an easy-to-use tool to detect banana diseases and pests. With an average 90 percent success rate in detecting a pest or a disease, the tool can help farmers avoid millions of dollars in losses.

## Mode of delivery at birth may play key role in shaping the child's skin microbiome

In a new study, investigators found that bacterial genera in children were more similar to those of their own mothers than to those of unrelated women. Their data suggest that the mode of delivery at birth could be an important factor in shaping the child's microbiome.

## What the brains of people with excellent general knowledge look like

Some people seem to have an answer to every general knowledge question; why?



The brains of people with excellent general knowledge are particularly efficiently wired. This was shown by neuroscientists using magnetic resonance imaging.

## Scientists create nano-size packets of genetic code aimed at brain cancer 'seed' cells



In a 'proof of concept' study, scientists say they have successfully delivered nano-size packets of genetic code called microRNAs to treat human brain tumors implanted in mice. The contents of the super-small containers were designed to target cancer stem cells, a kind of cellular 'seed' that produces countless progeny and is a relentless barrier to ridding the brain of malignant cells.

# Popular platforms for Coding Challenges

*if you want to improve your skills in an existing or a new programming language, one of the best ways to do it is through coding challenges.*

A lot of platforms and websites have become available over the years, providing exciting challenges for coders of all levels. Whether it's a new language you're trying to learn, or wish to test your wits in stressful situations — coding challenges can be both fun and a test at the same time.

The benefits, apart from the obvious, with working on these challenges include better problem-solving skills, in-depth language understanding, and the joy of learning new algorithms. As you know, algorithms aren't uncommon during the hiring process — so having some teeth in the game might give you an upper hand.

This post covers some of the best coding challenge websites and platforms that there are. Some are beginner-friendly, while others cater to a more experienced audience.

## Coderbyte

Coderbyte is a unique app-based on modern programming practices. Its core feature is coding challenges, which have helped millions of people across the globe to become better developers. Unlike similar apps on the market, Coderbyte is dedicated to helping people tackle industry-level issues.



One of the perks of using this platform is that it is working together with some of the leading software brands. E.g., Google, LogMeIn, HBO, PWC, and many others. If you ever wish to land a job at such companies, then rest assured that Coderbyte can give you the required challenges to test your skills.

Once you register, you can choose from challenges and algorithms. There are hundreds of thousands of user-submitted solutions, which can help you get a much broader understanding of specific programming topics.

Organizations can sign up and manage their screening process. By becoming a registered organization, you gain access to additional tools that can help screen each developer individually.

## Codewars

The beauty of consistent coding practice is that you're always coming up with new ways to solve problems. Codewars is capitalizing on this idea. Based on 'katas,' the platform provides exercises and challenges in a large variety of languages.

As you complete the said exercises, you can score points but also check how other programmers solved a specific problem. If you've meant to practice a new language, then Codewars is an exceptional site to add to your bookmarks.

Here are *some* of the supported languages: Clojure, Rust, Swift, Python, Haskell, Shell, JavaScript, PHP, Kotlin, Scala, and a lot of other languages are in the BETA program; available but with potential bottlenecks.





## Edabit



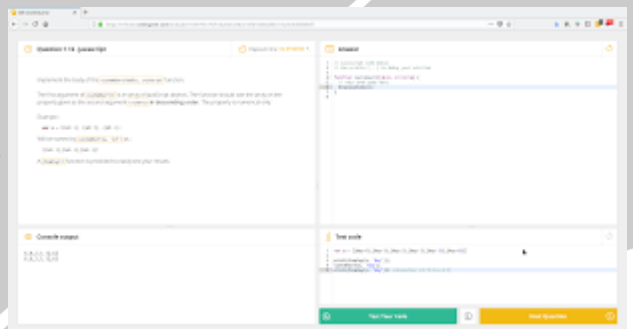
The easiest way to learn new things is to have consistent interaction with the thing you're trying to learn. Such is the case of programming, too. Reading the best books will give you zero knowledge unless you put the written word in practice.

Edabit is an established platform that offers bite-sized coding challenges, which can quickly improve your coding abilities. Fundamentally, Edabit wants to provide a platform that can bridge the gap between beginners and advanced coders. You can check out the Roadmap to see the full feature list.

## CodinGame

Games as learning platforms aren't an entirely new thing, but there seem to be a lot more players in the field now. CodinGame is just one of many platforms that provides programming challenges through a gamified experience. Rather than writing point-blank code, you're building a game environment instead. All the code you write, in some ways, is affecting the way that the 'game' is going.

Hindsight, platforms like CodinGame can help tech developers a lot about cause and effect. And how certain decisions lead to specific outcomes. This isn't just one of those cheap sites where you write sloppy JavaScript code. CodinGame involves some top-level algorithms and has countless world-class coders helping to provide solutions to both new and seasoned developers alike.



## HackerEarth



HackerEarth is a well-known platform that runs hackathons, coding challenges, and different kinds of competitions. It's also a place where you can pick up some interesting knowledge on the hiring process in modern companies. Not all, but a good amount of the challenges found in HackerEarth's database can end up being asked in any of your future job interviews.

And how is that possible? Well, mostly because HackerEarth's real hustle is to provide recruitment solutions to top-notch tech companies. If you want to be considered the best, you have to hang out with the best. It's a win-win situation for you.

## Programmr

Programmr is a dynamic digital lab for all levels of developers. With Programmr, you can write code, compile it, and execute projects directly from your browser. The platform supports all major languages used today. Whether it's a mobile app or a database structure you want to run — Programmr has the guts to support it. On the challenges side, Programmr has a custom set of challenges for Java, C++, PHP, C#, Ruby, Python, and iOS. Each set includes 100+ challenges, which can be sorted by popularity (based on user votes) and other factors. What sets these guys apart from others is that you can use your newfound experiences to get instant feedback whether it's a certificate for a specific language, or merely feedback from existing users.

## HackerRank



HackerRank is a startup focusing on providing coding challenges for individuals and organizations alike. Depending on the challenge, you're most often given instructions for a project that needs to be completed, and how you complete it is up to you. Currently, developers can use Java, Python, JavaScript, PHP, C++, and SQL to solve the provided challenges. Whenever you submit your solutions, the platform automatically scores your submission based on factors like accuracy. Afterward, you're placed in the global leaderboard, while cultivating achievements (badges) along the way. There's also 'sprints,' which is another term for platform-hosted contests.

## The Coding Train

Daniel Shiffman is a self-made one-person army, creating and producing great material on programming. The Coding Train is Daniels' personal YouTube platform where he shared exciting and helpful videos for tackling programming-related issues. But, he has this interesting approach. Rather than hosting everything on his website, he's using YouTube as the platform for the challenge, and his website as the platform for the solution. Do keep in mind that his challenges are based on P5.js and Processing — two popular solutions used in art and graphic design.

## Wolfram Challenges

Wolfram is one of the best-known companies in the world operating underneath the computer science branch. Their platform has left many speechless by its possibilities.

*There are plenty of examples of Challenges one can imagine that involve finding "the lowest-cost solution", or the "best fit". And it's a similar setup with typical machine learning tasks: find a function (say based on a neural network) that performs best on classifying a certain test set, etc.*

In comparison to other websites/platforms in this roundup, Wolfram covers a broad area of challenges and not just coding. All in all, if you want to sharpen your critical thinking — this is going to be the platform to do it!

## LeetCode

LeetCode is a product, meaning, it's not just a site hosting random challenges. Instead, LeetCode is a way to prepare yourself for future possibilities. The platform provides modern learning, intricate challenges, and a superb dashboard to get it all done from.

There's also articles, discussion boards, and other community aspects to encourage a seamless experience. Many LeetCode users have 'graduated' to work at companies like Uber, Amazon, Stripe, and others.

## Codeforces

Codeforces is for all the hardcore and dedicated coders out there. Think software engineers, pentesters, A.I. enthusiasts, and machine learning junkies! As a platform for advanced programmers, Codeforces is known for its notorious leaderboard and competitive spirit.



# NASA Finalized Four Landing Sites On Asteroid Bennu



It was two weeks ago when astronomers captured breathtaking photographs of the asteroid Bennu or 101955 Bennu through the asteroid-sampling OSIRIS-REx spacecraft. The spacecraft had managed to capture one of the closest shots of the asteroid.

With the help of these observations, NASA has managed to grasp the rough irregularity of Bennu's surface and selected four potential landing sites for the spacecraft. The spacecraft, since December 2018, has completely analyzed the asteroid surface to find the safest spots for it to land and collect samples from.

Out of the four sites, two will be finalized to get the primary landing site and a back-up site. The selection of these sites was challenging as the rocky terrain of Bennu is a spacecraft damaging threat. Dante Lauretta, OSIRIS-REx principal investigator at the University of Arizona, Tucson said in an official post by [NASA](#), "We knew that Bennu would surprise us, so we came prepared for whatever we might find, As with any mission of exploration, dealing with the unknown requires flexibility, resources and ingenuity. The OSIRIS-REx team has demonstrated these essential traits for overcoming the unexpected throughout the Bennu encounter."



The mission schedule included more than 300 extra days during asteroid operations to provide a tolerance period to deal with unexpected challenges. The mission team adapted their site selection process to demonstrating their resourcefulness. As mentioned earlier, the features will be named after mythological birds and bird-like creatures, but the landing sites have been named Nightingale, Kingfisher, Osprey, and Sandpiper, all indigenous to Egypt keeping with the theme of Bennu's name as it originates from the Egyptian depiction of a bennu heron.

The sample collection has been scheduled for the second half of 2020. The OSIRIS-REx spacecraft will return with the samples from the asteroid on September 24, 2023.

**Sachin Aggarwal (CSE- 3rd year)**



**By Rabindranath Tagore**

Life is given to us,  
we earn it by giving it.

Let the dead have the immortality of fame,  
but the living the immortality of love.

Life's errors cry for the merciful beauty  
that can modulate their isolation into a  
harmony with the whole.

Life, like a child, laughs,  
shaking its rattle of death as it runs.



# THOUGHTS OF A WALLFLOWER

*Echoes in the air.*

*Faces are a flare.*

*The petals cushion the head,*

*Where the demons reside.*

*Burning in rage!*

*Sorrows and apologies.*

*Flooding his mind.*

*Snap of the finger.*

*Music is in the air.*

*Smile on the faces.*

*The devils are dethroned.*

*As he watched from the sky up above.*

-MUKHAR BAJPAI

---

(CS 3<sup>RD</sup> YEAR)





# MOTIVATIONAL STORY



# The Group of Frogs (Encouragement)



As a group of frogs was traveling through the woods, two of them fell into a deep pit. When the other frogs crowded around the pit and saw how deep it was, they told the two frogs that there was no hope left for them.

However, the two frogs decided to ignore what the others were saying and they proceeded to try and jump out of the pit. Despite their efforts, the group of frogs at the top of the pit were still saying that they should just give up. That they would never make it out.

Eventually, one of the frogs took heed to what the others were saying and he gave up, falling down to his death. The other frog continued to jump as hard as he could. Again, the crowd of frogs yelled at him to stop the pain and just die.

He jumped even harder and finally made it out. When he got out, the other frogs said, “Did you not hear us?”

The frog explained to them that he was deaf. He thought they were encouraging him the entire time

Moral of the story:

People’s words can have a big effect on other’s lives. Think about what you say before it comes out of your mouth. It might just be the difference between life and death.



## Struggles develop strength

One day a man was passing by a garden when he saw a butterfly cocoon which was about to get open. He saw a small opening on it and watched the several hours of struggles the butterfly came through to get the body out of it. After many hours, it seemed that the butterfly stopped trying as there was no progress.

He thought to help the butterfly by cutting the cocoon with a scissor. So the butterfly came out easily but the wings were shriveled and the body was tiny and withered.

Unfortunately, the butterfly was not able to take flight and spend the rest of life crawling with a wounded body.

**Moral:** This is nature's way of telling the importance of struggles in life. Sometimes, different kinds of struggles are needed in life to make you stronger in the future. Never feel disappointed in life and stop trying when life offers you struggles but keep on fighting until you see success.





# RESULTS & PLACEMENT



## B.Tech 3<sup>rd</sup> Year (Even Sem)-Top 10

S.N	Roll No.	Name	MARKS
1	1614310221	VISHAL SHARMA	894
2	1614310151	RENUKA SINGH	884
3	1614310105	DIVI GUPTA	878
4	1614310095	HIMANSHU SINGH	875
5	1614310123	NAMAN TYAGI	869
6	1614310130	NITISH SINGH	860
7	1614310067	DEEPAK JAIN	858
8	1614310140	PRIYA PATEL	856
9	1614310002	ABHAY MUDGAL	856
10	1614310116	MIMANSHA SINGH	847

## B.Tech 2<sup>nd</sup> Year (Even Sem)-Top 10

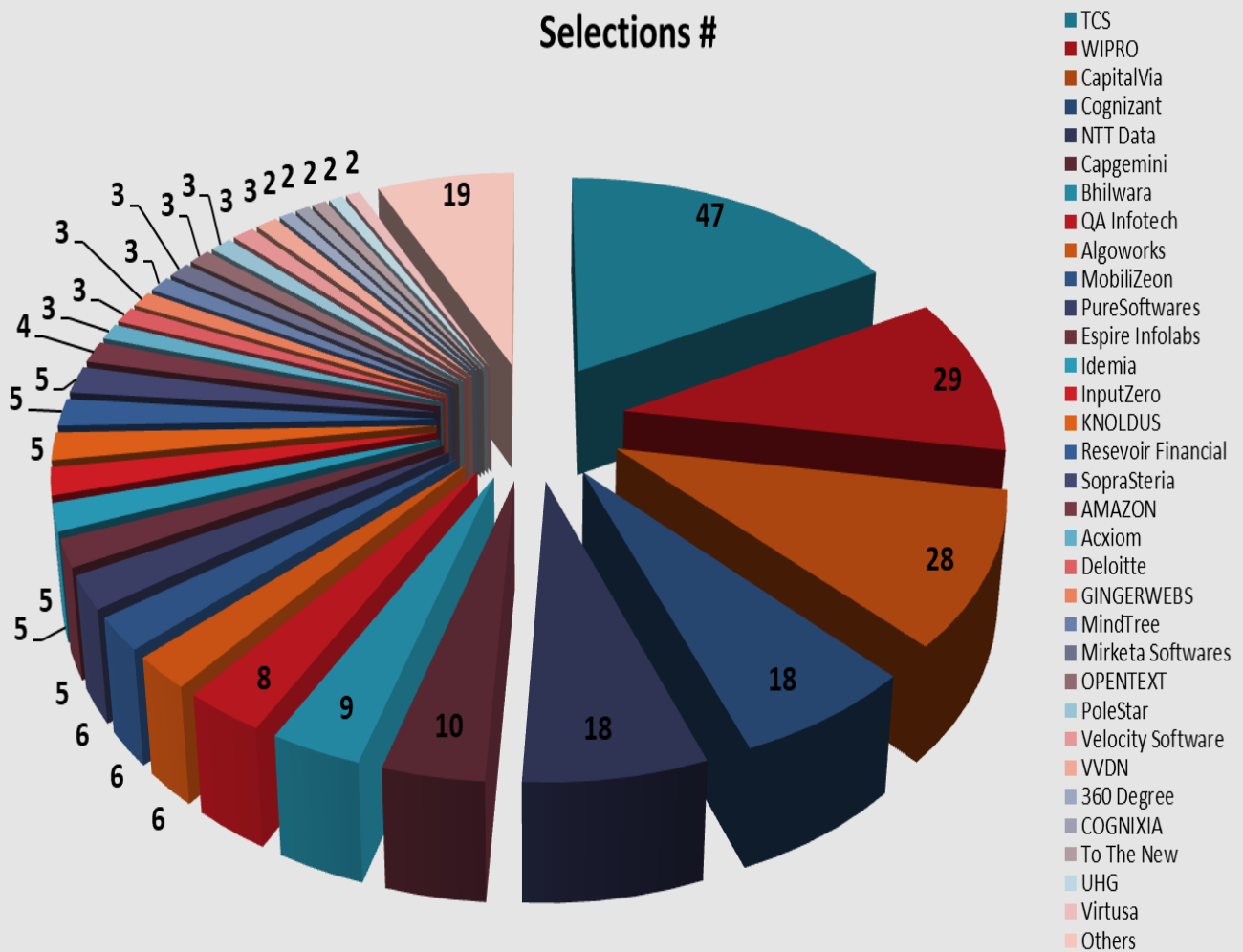
S.N	Roll No.	Name	%
1	1714310193	SONAL TANDON	91.2
2	1714310179	SHIVI VATS	89.4
3	1714310214	VEDANT SINGH	88.3
4	1714310126	PRAKHAR AGARWAL	87.2
5	1714310207	UTKARSH UPADHYAY	86.9
6	1714310083	JAGRATI SAHU	86.2
7	1714310049	AVISHA SHARMA	86.0
8	1714310073	HARSH AGARWAL	85.9
9	1714310018	AKASH PANDEY	85.7
10	1714310184	SHRADHA AGARWAL	85.6

# Placements 2018-19

Highest Package: 6.8 Llacs

More than 75% placements

Selections #







# DEPARTMENTAL EVENTS

EVENTS  
DEPARTMENTAL



# One week AICTE Approved FDP on Data Analytics with special focus on Python

Department of Computer Science & Engineering, IMS Engineering College organized one week FDP on "**Data Analytics with special focus on Python**" during **22 July 2019 to 26 July 2019**. **FDP was in collaboration with Electronics & ICT Academy of IIT Roorkee**. FDP is approved by AICTE & was sponsored by MeitY Govt. of India. 47 participants from various academic institutions of India participated in the FDP.

Following were the resource persons for the FDP

Mr. Sriraman Rajagopalan ,Vowel Softech

Dr. Partha Pratim Roy, IIT Roorkee

Dr. Sanjeev Manhas,IIT Roorkee

## Valedictory Session

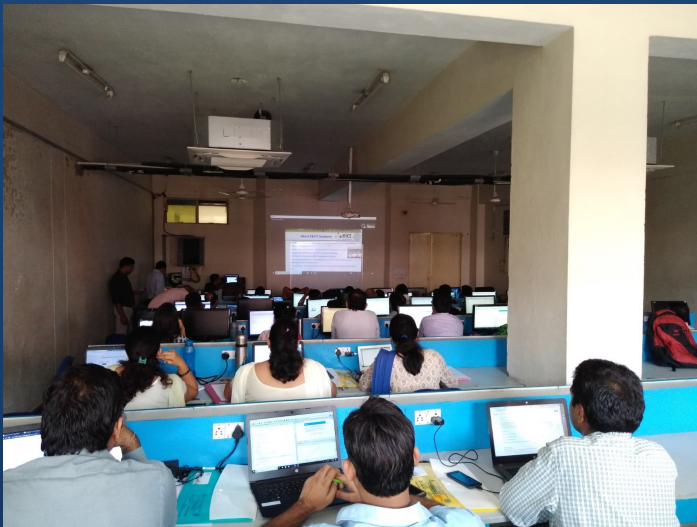






# A faculty Development program on “Python Programming”

A faculty Development program on “Python Programming” for faculty members was organized during 15<sup>th</sup> July 2019-19<sup>th</sup> July 2019. The program was conducted through “Learnkart Technology Pvt Ltd, Bangalore.



The objective of this program was to introduce the basic concepts of Python Programming to faculty members so that faculty members can further take up the teaching assignments on this subject.

# UPCOMING EVENTS



UPCOMING EVENTS

## UPCOMING EVENTS

**1. PYTHON and MATLAB Project Course on Design and Performance Analysis of 5G Wireless Systems: mmwave, Massive MIMO, NOMA, FBMC, Full Duplex and iot organized by IIT Kanpur from November 13th to 19th, 2019.**

Registration for the short course is OPEN.

Last date for registration is 28th October, 2019

**2. CSIR Sponsored One Day National Level Seminar on “Deep Learning Technique at Hindusthan Institute of Technology, National Highway 83, Malumichampatty, Tamil Nadu, India.**

- **Event Start Date** - Wed, 28 Aug '19
- **Event End Date** - Wed, 28 Aug '19

Coordinator:

Mr.K.Mahendran

Phone : 9976064001

Email : [hitech.csirece@gmail.com](mailto:hitech.csirece@gmail.com)

**3. E-SUMMIT 19, Solan, Himachal Pradesh, India :-**

**The Entrepreneurship Summit of Jaypee University of Information Technology** is conducted with the vision of molding the future you of the country into self-independent and intellectual beings. Entrepreneurship is the key that can unlock this hidden potential in each individual.

**Event Start Date** - Sat, 28 Sep '19

**Event End Date** - Sun, 29 Sep '19

**4. IITBHU MUN 2019 Varanasi, Uttar Pradesh, India.**

**Event Descriptions:**

IITBHU MUN – The conference which will take you to an expedition of intense debating and discussion on the most demanding global issues. This conference aims to sensitize the youth towards the germane issues surrounding them and give them the perfect platform to make them conscious of their roles as concerned individuals in the society, to make them pause and think of the solutions to solve the fundamental issues of global importance. Being put together by a resolute team of students, we strive for a healthy and interactive conference organized in a highly planned manner for all the delegates.

- **Event Start Date** - Fri, 30 Aug '19
- **Event End Date** - Sun, 01 Sep '19



## **5. VIT Hack 2019, VIT University, Hackathon , Vellore, Tamil Nadu, 20-22nd September 2019.**

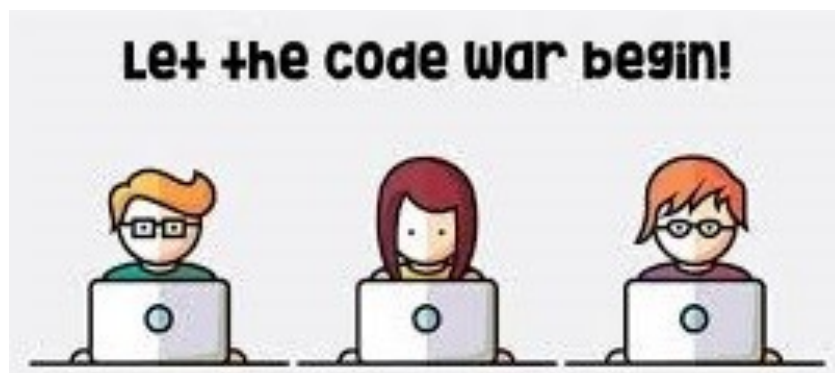
### **Event Details:**

A 36-hour long hackathon which will comprise of everything ranging from insightful talks by leading industry experts, a chance to network with tycoons from the IT-industry, ideation, innovation, implementation and an incubation round where participants will get an opportunity to take their ideas to the next level. We will present participants with real-world problems faced by huge companies to which they will find viable solutions, this will spark the fire of entrepreneurship in them while simultaneously helping large IT conglomerates with problems faced by their sector.

# CODING CHALLENGE

## CODING CHALLENGE

**For Second Year and Third Year Students**



**Submit your answers to the mentioned E-mail IDs :**

**[hodcse@imsec.ac.in](mailto:hodcse@imsec.ac.in), [thebyte.cse.imsec@gmail.com](mailto:thebyte.cse.imsec@gmail.com)**

**Timeline : 26-08-2019, 12:00 PM**

**Appreciation: Trophy and certificates will be given to the winners and runner-up.**

## CHALLENGE I

Here are  $NN$  police officers numbered  $11$  through  $NN$  and  $MM$  thieves, numbered  $11$  through  $MM$ . All people (police officers and thieves) are points in a Cartesian plane. Let's denote the coordinates of the  $ii$ -th officer by  $(X_{pi}, Y_{pi})$ , and the coordinates of the  $ii$ -th thief by  $(X_{ti}, Y_{ti})$ .

A thief is *arrested* if there is a subset of police officers which form a convex polygon such that the thief is located strictly inside that polygon.

The police station wants to send reinforcements — zero or more police officers — to make sure all the thieves are arrested. The coordinates of these additional officers may be chosen arbitrarily (they may be any real numbers); it is not allowed to move the officers which were present initially. Calculate the minimum number of police officers that need to be sent as reinforcements in order to arrest all the thieves.

---

### Input

- The first line of the input contains a single integer  $TT$  denoting the number of test cases. The description of  $TT$  test cases follows.
- The first line of each test case contains two space-separated integers  $NN$  and  $MM$ .
- $NN$  lines follow. For each  $ii$  ( $1 \leq i \leq N$ ), the  $ii$ -th of these lines contains two space-separated integers  $X_{pi}$  and  $Y_{pi}$ .
- $MM$  more lines follow. For each  $ii$  ( $1 \leq i \leq M$ ), the  $ii$ -th of these lines contains two space-separated integers  $X_{ti}$  and  $Y_{ti}$ .

---

### Output

For each test case, print a single line containing one integer — the minimum number of additional police officers.

---

### Constraints

- $1 \leq T \leq 10$
- $0 \leq N \leq 105$
- $1 \leq M \leq 105$
- $|X_{pi}|, |Y_{pi}| \leq 2 \cdot 10^8$  for each valid  $ii$
- $|X_{ti}|, |Y_{ti}| \leq 2 \cdot 10^8$  for each valid  $ii$
- no two people (police officers or thieves) have the same position

---

### Subtasks

**Subtask #1 (40 points):**  $N, M \leq 1,000$

**Subtask #2 (60 points):** original constraints

---

### Example Input

```
1
1 1
10 10
20 20
```

---

### Example Output

```
2
```



## CHALLENGE II

A king in a distant land wants to build a new palace for himself. There are some plots of land in the country. Some of them don't have any owner, some of the plots are owned by the citizens of the country. Being a good person, the king wants to pay the appropriate amount of money for the land he uses. If he uses some portion of a plot, he needs to buy the whole plot. Also, this is a weird country where the plots owned by the citizens may overlap. For an area, the king needs to buy all the overlapping plots to use that area. To use some area not owned by any citizen, the king doesn't need to spend any money.

Formally, the country is an  $M \times N$  grid with  $L$  plots owned by the citizens. Each of these plots is rectangular in shape. The  $i^{\text{th}}$  plot has its lower left corner at  $(x_i, y_i)$ , length  $l_i$  (along with the  $x$ -axis), width  $w_i$  (along with the  $y$ -axis), and price  $p_i$ . The palace the king is going to build should be rectangular in shape as well. Please help him to find the rectangular place with the largest area which he can use without spending more than  $C$  amount of money.

$(0,0)$  is the lower left corner of the country and  $(M, N)$  is the upper right corner. All the plots owned by the citizens are inside this area. The palace should be inside this area as well. The sides of the palace should be axis-parallel.

---

### Input

- The first line of the input contains an integer  $T$  denoting the number of test cases. Description of each test case is given below.
- The first line of each test case contains three integers  $M$ ,  $N$ , and  $C$ .
- The second line contains  $L$ .
- Each of next  $L$  lines contains the description of a plot owned by a citizen.  $i^{\text{th}}$  of these line has five integers:  $x_i$ ,  $y_i$ ,  $l_i$ ,  $w_i$ , and  $p_i$ .

---

### Output

For each test case, print "Case i: ", and then the answer  $(\text{mod } 10^9 + 7)$ , where  $i$  is the testcase number, 1-indexed. The answer should be the largest area of the rectangular shaped land that can be used without spending more than  $C$  amount of money.

---

### Constraints

- $1 \leq T \leq 10$
- $1 \leq M, N \leq 1000$
- $0 \leq C \leq 10000000000$
- $0 \leq x_i \leq M - l_i$
- $0 \leq y_i \leq N - w_i$
- $1 \leq l_i, w_i$
- $1 \leq p_i \leq 100000$
- $1 \leq L \leq 1000$

1

11

10 10

20 20

---

### Example Output

2

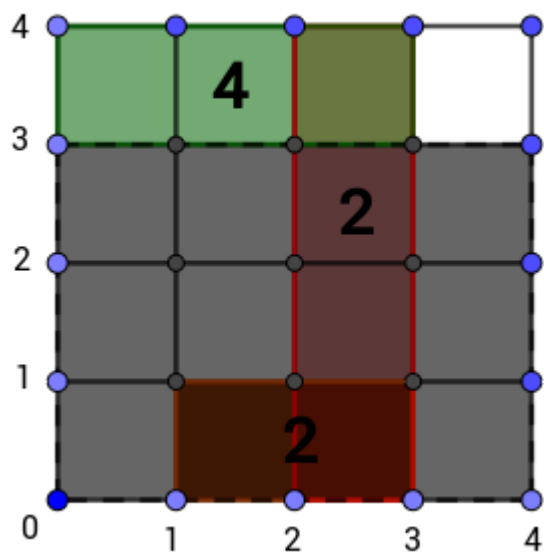
Example Input

1  
4 4 6  
3  
1 0 2 1 2  
2 0 1 4 2  
0 3 3 1 4

Output:

Case 1: 12

Explanation



The image above shows the lands owned by the citizens and the palace with area **12** (lower left corner at **(0,0)** and upper right corner at **(4,3)**).

## CHALLENGE III

There are  $n$  people who call themselves *friends*. However, you can't trust people blindly these days! Not each of these people trusts all the other people. The good thing is, still there are some pairs of people who trust each other and consider each other as *true friends*. Also, each person has a *best friend*. Note that a *best friend* is also a *true friend*.

These relations are symmetric. Formally, person  $A$  has several *true friends* who also consider  $A$  as a *true friend*. Person  $A$  has exactly one *best friend*,  $B$ , and  $A$  is also the *best friend* of  $B$ .

Each person has a secret. Those  $n$  secrets are written on  $n$  pieces of papers. Those papers are sealed inside  $n$  envelopes. The name of the person, whose secret is written on the paper inside an envelope, is written on the envelope. These  $n$  envelopes are distributed among the  $n$  people. At each step, one person exchanges the envelope (without opening it) he/she is holding with one of his/her *true friends*. Your job is to determine the minimum number of steps (exchanges) required to end up at an arrangement where secret about each person reaches the hand of that person or the best friend of that person, i.e. finally after these exchanges when the envelopes are opened, the secrets of a particular person is either seen by himself or his best friend.

---

### Input

- The first line of the input is the number of test cases,  $T$ . Description of each test case is given below.
- The first line of each test case will contain the number of people  $n$ .
- The second line will contain  $n$  space-separated numbers  $e_1, e_2, \dots, e_n$  which is a permutation of  $1, 2, \dots, n$ . Initially, the  $i^{\text{th}}$  person will hold the secret for  $e_i^{\text{th}}$  person.
- The third line will contain  $n$  space-separated numbers  $f_1, f_2, \dots, f_n$  which is a permutation of  $1, 2, \dots, n$ . The  $f_i^{\text{th}}$  person is the best friend of the  $i^{\text{th}}$  person.
- The fourth line will contain a number  $m$ .
- Each of next  $m$  lines will contain two space-separated integers  $a_i$  and  $b_i$  denoting that  $a_i$  and  $b_i$  are *true friends*. Note that *best friends* are *true friends* by definition. They will not be explicitly listed as *true friends*.
- An empty line will be printed after each test case.

---

### Output

For each test case, print "Case i: ", and then the answer, where  $i$  is the testcase number, 1-indexed. The answer should be the required number of steps. If it's not possible to make all the secrets (envelopes) reach in safe hands, the answer should be **"IMPOSSIBLE"** (without quotes)

---

### Constraints

- $1 \leq T \leq 10$
- $1 \leq n \leq 10$
- $n$  will be even
- $0 \leq m \leq 10$
- $1 \leq e_i, f_i, a_i, b_i \leq n$
- The answer, if it exists, will be less than or equal to 18.



---

## Example

### Input:

2

4

2 3 4 1

3 4 1 2

1

2 3

4

2 1 4 3

3 4 1 2

0

### Output:

Case 1: 4

Case 2: IMPOSSIBLE

*Thank  
you*

*Dear Readers Editorial Board welcomes articles for the next issue of "THE BYTE", AUGUST 2019.*

*Please send your articles @ below email id:*

imseccsdept@gmail.com ,  
thebyte.cse.imsec@gmail.com



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