

Department of Computer Applications (MCA)



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Alumni Section





Request

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Software Architecture & Software Architect

Software architecture is, simply, the organization of a system. This organization includes all components, how they interact with each other, the environment in which they operate, and the principles used to design the software. In many cases, it can also include the evolution of the software into the future.

Software Architectures are designed to accomplish a specific vision and while designing architecture one must keep in mind about "Quality Attributes" and "Stake holders" of that mission.

Stake Holders: It comprise "What the system should do". All those people, for whom developers, architects and managers work all over the world, are called stakeholders. Developers themselves are also among these people. These are the people who affect or get affected by the project. Architecture must be designed by keeping in mind about these people.

Quality Attributes: It comprise "How the system should work". The parameters that are used to evaluate a whole system, and not only a specific behavior, are known as Quality Attributes. These parameters affect system behavior, design, user interface, development and support of system during work.



There are number of well-established software architectures and keeping up evolving as per the market demand and requirements for betterment. Listing below some of them:

Client Server Event-Driven Layered/Multi Layered Micro services Data-centric Monolithic application Representational State Transfer (REST) Peer-to-peer Blackboard

Service-oriented Shared nothing architecture

... And many others. Have a look on some of them:

<u>Client Server Architecture:</u> This pattern consists of two parties; a server and multiple clients. The server

component will provide services to multiple client components. Clients request services from the server and the server provides relevant services to those clients. Furthermore, the server continues to listen to client requests.

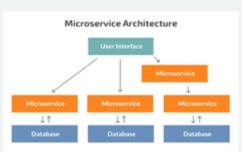
Usage: Online applications such as email, document sharing and banking

Monolithic Architecture: Monolithic, in this context, means composed all in one piece. Means component of the programs are interconnected and interest and intere

interdependent. In a tightly-coupled architecture, each component and its associated components must be present in order for code to be executed or compiled. Furthermore, if any program component must be updated, the whole application has to be rewritten. However this architecture several pros as well like: simple development and deployment, easier debugging and testing.

Micro Services Architecture: Micro services are an architectural pattern that structures an application as a

collection of small, loosely coupled services that operate together to achieve a common goal. Because they work independently, they can be added, removed, or upgraded without interfering with other applications. While there are numerous benefits to micro services architecture, like easier deployment and testing, improved productivity, flexibility, and scalability, they also pose a few disadvantages, as independently run micro services require a seamless method of communication to operate as one larger application.



Software Architect, role and responsibilities:

A software architect is a software expert who makes high-level design choices and dictates technical standards, including software coding standards, tools, and platforms. The leading expert is referred to as the chief architect.

Being a software one should have characteristics like: Communicability, Broad and deep knowledge of several technologies and also be prepared to compose a large number of technical documentation, reports, and diagrams, management skills, analytical skills. Architect decisions are usually the most expensive. Therefore, a person in this position should take the most responsible approach to his work and the decisions made

The architect's work includes:

- · Identifying the stakeholders on the project.
- · Identifying business requirements and requirements of the stakeholders on the project.
- · Designing the entire system based on the received requirements.
- · Choosing the system architecture and each component of this system at a high level.
- · Choosing the technologies for the implementation of each component and connections between the parts.
- Architectural and code review
- · Writing project documentation and support it
- · Creating unified development standards in the company

There are several recommended books mentioned below that can help you to become a Software Architect:

- Fundamentals of Software Architecture
- Software Architecture in Practice
- · Domain-Driven Design: Tackling Complexity in the Heart of Software
- · Patterns of Enterprise Application Architecture







WHO launches women's health chatbot with messaging on breast cancer

HO has launched a new interactive chatbot on women's health. The first set of messages to be included relates to breast cancer, in time for Breast Cancer Awareness Month, observed in October every year. The new chatbot, which uses the Viber platform to deliver health information directly to subscribers' mobile phones, is the latest in a series. Previous chatbots disseminated information on COVID-19, mental health and smoking cessation.

People subscribing to the new chatbot will find information on how to reduce the risk of breast cancer, symptoms and treatment options. Initially launched in English, Greek, Hungarian, Russian and Ukrainian, the chatbot will also soon be available in other languages too. Colorful stickers with supportive slogans are also available on the platform for sharing. Recognizing the importance of initiatives such as this one in equipping people with the knowledge that enables them to take better care of their health, Dr Bente Mikkelsen, Director of the Department of Noncommunicable Diseases at the World Health Organization said: "I am delighted to see this new initiative to better inform women about breast cancer, now the most common form of cancer worldwide. Knowing what to look for and when to seek care can literally save lives."



Scientists share data from first WHO-recommended malaria vaccine

Earlier this month, RTS,S/AS01 (also known as RTS,S) became the first malaria vaccine recommended by WHO for broad use among children in areas with moderate to high transmission of *P. falciparum* malaria. The recommendation was informed by the results of an ongoing WHO-coordinated pilot program in 3 African countries that has reached more than 800 000 children since 2019.

In a virtual forum on 18 October 2021, WHO and partners shared 2 years of data from the pilot program and discussed next steps for the broader use of RTS, S as a new preventive tool in the malaria control toolkit. Participants also took stock of new malaria vaccine candidates in the pipeline and of new initiatives to evaluate and produce vaccines in Africa.

Co-hosted by WHO and the European & Developing Countries Clinical Trials Partnership (EDCTP), the forum was co-chaired by Rose Leke, Professor of Immunology and Parasitology at University of Yaoundé in Cameroon; Dr Kalu Akpaka, Team Leader for Tropical and Vector-borne Diseases in the WHO Regional Office for Africa; and Mrs. Inmaculada Peña's-Jiménez, EDCTP Policy Officer at the European Commission.

Malaria progress at a standstill

Opening the forum, Professor Rose Leke noted: "The historic announcement by WHO on the RTS, S vaccine comes at a critical turning point in the fight against malaria. As WHO has reported in recent years, global progress against malaria has stalled and many countries with a high burden of the disease have been losing ground."

Each year, more than 400 000 people continue to die from malaria and there are more than 200 million new cases of the disease. Sub-Saharan Africa shoulders the highest burden of the disease, accounting for more than 90% of malaria cases and deaths annually. Without urgent and accelerated action, the targets of WHO's global malaria strategy will be missed.

In recent years, mosquito resistance to insecticides and parasite resistance to antimalarial drugs have emerged as key threats to future progress against malaria. The COVID-19 pandemic has presented an added challenge for malaria responses worldwide, undermining efforts to deliver critical prevention, detection, and treatment services.

"These trends are worrying, and they spotlight the need for the malaria community to rethink its strategy," said Professor Leke. "Clearly new tools and approaches will be needed to beat back the disease."



TCL unveils full-color micro LED AR glasses

Consumer electronics brand TCL has released the first binocular full-color Micro LED AR glasses 'Thunderbird Smart Glasses Pioneer Edition' in China.

At present, TCL has not revealed the price and availability of the AR glasses, reports GSMArena.In terms of specifications, it features a micro LED display and contain a waveguide developed in-house by TCL.

Thunderbird Smart Glasses look like normal sunglasses with color screens that are transparent and comes with an inbuilt camera. The brand has also shared a video showing an overview of specifications offered by the Thunderbird Smart Glasses Pioneer Edition. The device features a Micro LED display with 4um (micrometer) pixels.

TCL's new smart glasses will compete with Xiaomi's Smart Spectacles and Facebook's Ray-Ban Stories smart glasses. The new Xiaomi Smart Glasses weigh only 51 grams, and it supports XiaoAl Al assistant for voice commands.

It houses a display chip measuring just 2.4×2.02 mm. Under a microscope, Xiaomi says the display is roughly the size of a grain of rice, with individual pixels sized at 4im.In addition, Facebook in partnership with Ray-Ban recently launched its first smart glasses named 'Ray-Ban Stories'.

Built in partnership with Facebook and Essilor Luxottica, Ray-Ban Stories start at \$299 and will be available for purchase in 20 style combinations online and in select retail stores in the US as well as Australia, Canada, Ireland, Italy and the UK.

The frames feature two-front 5MP facing cameras for capturing video and photos. There's a physical button on the glasses for recording or one can say "Hey Facebook, take a video" to control them hands-free.



Heart failure getting younger

Over the last few years, cardiovascular diseases have become one of the leading causes of mortality in India. According to a 2019 study, one in four deaths in India were caused by cardiovascular diseases. While cardiovascular diseases are known to affect all age groups, there has been an increase in these diseases being reported in the younger population.

In fact, studies show that there has been an increase in the presence of cardiovascular diseases in people not older than 30. Factors such as increased stress levels can influence the occurrence of heart disease in the young, leading to complications such as heart failure.

Heart failure is a condition which occurs when the heart is unable to pump sufficient blood around the body, thus affecting the supply of necessary oxygen and nourishment to the rest of the body. It can also result in fluids building up in the lungs, leading to difficulty in breathing.

It is often caused by underlying medical conditions which may have caused damage to the heart, including coronary heart disease, high blood pressure, diabetes, and high cholesterol, anemia, kidney disease, among others. This disease affects about 1-2 per cent of our adult population, with an increased predisposition in older age. People of our South-Asian ancestry carry nearly 80 per cent relatively higher risk of heart-failure.

While the risk of heart failure increases in older age, our population bears an increased risk of premature cardiometabolic diseases, and as a result, may also develop heart failure relatively earlier. Several modifiable aspects like uncontrolled hypertension, diabetes, obesity, high lipid-levels, smoking, tobacco consumption, and stress, may predispose to developing heart-disease prematurely, in younger age.

Today's youth is caught in an imbroglio of hectic schedules, high-pressure jobs, demanding academic regimes, poor dietary choices, and lack of physical activity. This is leading to reduced sleep, poor quality of sleep, increased incidence of smoking and frequent alcohol intake, along with increased stress levels.

Prolonged stress has long-term consequences that inhibit the body's ability to recover and relax. Such a maladaptive state may lead to increased blood pressure, metabolic derangements, and health-complications. This can directly affect the cardiovascular system, depress the health status, and make it vulnerable to a host of diseases.

A healthy heart is the sum total of the food you eat, the amount and quality of your sleep, the schedule you maintain, the exercise regime you follow, and the management of stress levels. Adopting healthy lifestyle measures is the key to good heart-health. Adequate physical activity, avoiding consumption of tobacco, keeping blood pressure in check by reducing salt intake and or appropriate medication, managing lipid levels with a balanced diet, sleeping enough and at appropriate time, are essential. Diabetes, obesity, or hypertension, need to be taken seriously.



Harris to travel to Paris in November for talks with Macron

Vice President Kamala Harris will head in November to Paris for talks with French President Emmanuel Macron, according to the White House.

The White House announced Harris' visit to France as President Joe Biden and Macron spoke by phone on 22nd October, 2021. The two presidents are scheduled to meet in Rome in November on the margins of the Group of 20 summit.

Macron's office said in a statement that he and Biden discussed "the establishment of a stronger European defense, complementary to NATO and contributing to global security."

In addition to meeting with Macron, Harris will deliver a speech on Nov. 11 at the annual Paris Peace Forum and participate the following day in the Paris Conference on Libya. She will be joined by her husband Douglas Emhoff for the visit.

The scheduled meeting comes amid an effort by the Biden administration to soothe its relationship with the French which became strained by a U.S. Deal announced last month to sell nuclear-powered submarines to Australia. The move by the U.S. Undercut a more than \$60 billion deal by a French defense contractor to sell diesel-powered submarines to Australia.

"They will discuss the importance of the transatlantic relationship to global peace and security and underscore the importance of our partnership on global challenges from COVID-19 and the climate crisis to issues affecting the Sahel and the Indo-Pacific," Harris senior adviser Symone Sanders said in a statement.

Harris and Emhoff's visit coincides with Veterans Day in the U.S. And Armistice Day in France. The two plan to mark the solemn commemorations with a visit to Suresnes American Cemetery outside Paris, Sanders said.



Samsung 3nm chips expected to arrive in H1 2022

Samsung has announced that it will start producing customers' first 3nm-based chip designs in the first half of 2022, while its second generation of 3nm is expected in 2023. Compared with the 5nm process, the 3nm gate-all-around (GAA) node boosts performance by 30 per cent, lowers power consumption 50 per cent and takes up 35 per cent less space, the company claimed in a statement. Newly added to Samsung's technology roadmap, the 2nm process node with MBCFET is in the early stages of development with mass production in 2025.

"We will increase our overall production capacity and lead the most advanced technologies while taking silicon scaling a step further and continuing technological innovation by application," Siyoung Choi, President and Head of Foundry Business at Samsung Electronics, said in a statement. Choi noted 3nm products will be produced at its fab in Pyeongtaek, South Korea, which is being expanded.

"Amid further digitalization prompted by the Covid-19 pandemic, our customers and partners will discover the limitless potential of silicon implementation for delivering the right technology at the right time," Choi added.

The current generation of smartphones from Samsung and Apple (manufactured by Samsung, Qualcomm, and TSMC) are powered by SoC's built on the 5nm process.



The death sting

A ccording to the World Health Organization (WHO), Dengue cases have grown dramatically around the world in recent decades. A vast majority of cases are asymptomatic or mild and self-managed, and hence the actual numbers of Dengue cases are under-reported. Many cases are also misdiagnosed as other febrile illnesses.

With the advent of the rainy season, we surely get some respite from the scorching summer heat but many water-borne diseases tag along. And one of the most common diseases is Dengue, a mosquito-borne viral infection that is common in warm, tropical climates. It is caused by any one of four closely related antigenically distinct groups called serotypes that are DENV-1, DENV-2, DENV-3 and DENV-4, which means that it is possible to be infected four times in a lifetime. A particular serotype can be predominant at different times in a geographical area. It gives space to a wide number of symptoms that can be extremely mild (unnoticeable) to extremely severe. In severe cases, it can also be fatal.

Currently, Delhi is witnessing a surge in cases, reporting the maximum number of cases since 2018 for the same period due to prolonged monsoon. Whereas Punjab which observed 8,400 cases last year has reported only 5,889 cases this year, Hoshiarpur topping the list with 933 cases.

While many Dengue infections cause only mild illness, there have been cases where it has also caused an acute flu-like illness. Over time, this forms into a potentially lethal complication, called severe Dengue. WHO states that severe Dengue is a leading cause of serious illness and death in some Asian and Latin American countries and requires management by medical professionals.

As per a comparative study published in Clinical Infectious Diseases, the incidence of Dengue has grown dramatically around the world in recent decades. A vast majority of cases are asymptomatic or mild and self-managed, and hence the actual numbers of Dengue cases are under-reported. Many cases are also misdiagnosed as other febrile illnesses.

The number of Dengue cases reported to WHO increased eight times over the last two decades, from 505,430 cases in 2000 to over 2.4 million in 2010, and 5.2 million in 2019. Reported deaths between the years 2000 and 2015 increased from 960 to 4032.

The DENV-2 or D2 variant of Dengue was struck many cases of fever and deaths in western UP districts of Firozabad, Agra, Mathura and Aligarh. The term severe Dengue is in circulation now. It was earlier known as Dengue hemorrhagic fever and Dengue shock syndrome. The new variant has been observed in 11 states and has become a topic of discussion amongst medical experts and organizations. "With DENV-2 type there seems to be a higher incidence of Dengue hemorrhagic fever where there is a capillary leak and bleed with low platelets and it may eventually progress to Dengue shock syndrome where blood pressure drops," Dr Dilip Gude, Sr Consultant Physician, Yashoda Hospitals Hyderabad tells you.

"A person previously infected with Dengue when gets infected with a different serotype has a higher chance of developing hemorrhagic fever or shock syndrome," tells Dr Anurag Aggarwal, Consultant Internal Medicine, QRG Super Specialty Hospital.

Talking about the symptoms, they can develop four to 10 days after the mosquito bites and last anywhere from two to seven days. We might be aware of only the common, usually talked about symptoms like high fever, severe body pain and internal bleeding with falling platelets but Dr Aggarwal gives a detailed note on the same. "Highgrade fever with chills, backache, abdominal pain, rash, vomiting, joint pains, muscle aches, generalized weakness and fatigue and in severe cases shock, hemorrhagic manifestation like vomiting out blood, bleeding from anus, nose, gums and blood in the urine."

He further adds that when a patient is having severe abdominal pain, recurrent vomiting and increased irritability, it may indicate the patient is developing severe Dengue. The intensity of fever has no correlation with the severity of illness a patient develops in the following days of illness.

In case one is facing possible symptoms and is skeptical about the testing, all you need to know is that there are two ways to get yourself tested, a card test and ELISA. Dr Aggarwal elaborates, "Testing is done by blood. One is through the card test which is not as sensitive as another test called ELISA. Two types of antigens are of significance, NS1 which is usually detectable within 24 hrs. of symptom onset and may remain positive until nine days and other is IgM which is usually detectable four to five days after symptom onset and remains positive up to 12 weeks after catching an infection or maybe even longer."

More than 20,000 confirmed Dengue cases across the country have been reported with more than 220 deaths occurring only in Uttar Pradesh. Cases have been reported from Andhra Pradesh, Gujarat, Karnataka, Kerala, MP, Uttar Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, and Telangana.

There are no vaccines and currently, the treatment of Dengue is through supportive care and no specific medication is available. "The management includes intravenous fluid therapy, monitoring of the clinical condition, and intensive care. This helps reduce the morbidity and mortality in Dengue fever complications. Mild and uncomplicated cases can be managed at home under the supervision of the doctor," Dr Anjali Saxena, Senior Consultant, General Pediatrics tells you.

Moreover, WHO has advised that patients should seek medical advice, rest and drink plenty of fluids. Paracetamol can be taken to bring down fever and reduce joint pains. However, aspirin or ibuprofen should not be taken since they can increase the risk of bleeding.

We can say that the Dengue outbreak is still under control but it has led to a surge in cases of high fever countrywide. As it is known to cause more morbidity than other variants, patients are having high-grade fever. Dr Gude tells you that there is an epidemiological hypothesis that there is a four-year cyclical spurt for Dengue outbursts and DENV-2 serotype now is known to cause a much-complicated disease. With this, he advises that early diagnosis, aggressive hydration, and admitting high-risk groups such as the elderly and children and immunosuppressed patients may be important.

Considering the pandemic, how worried should we be about the Dengue virus? Are there chances that it could worsen amidst the pandemic? These are again a few questions that might cross our minds. Early symptoms of both COVID and Dengue can be the same and it would be nearly impossible for a common man to self-detect if he/she has been infected by corona or Dengue. And coinfections are common and if someone gets COVID and Dengue then your safety is in your hands and making sure that you are not giving a breeding ground to mosquitoes is your responsibility. Keep the surroundings of your house as dry as possible with no scope for stagnant water, cover your body with full sleeves clothes, put on mosquito repellent creams, coils, nets. Dr Gude suggests that having a high index of suspicion and taking a clinician's help as early as possible is important.

"Do not allow water to stagnate, cover drains or sprinkle oil over stagnated water, empty pots/tyres of water in your house, wear full sleeves clothes when stepping outside the house," Dr Aggarwal tells you.

He further adds that in case of fever, visit your nearest physician as soon as possible. Watch for symptoms like intense abdominal pain, bleeding from any site, restlessness and breathlessness when you need to be concerned. "The proximity of mosquito vector breeding sites to human habitation is a significant risk factor for Dengue as well as for other diseases that Aedes mosquito transmit. At present, the main method to control or prevent the transmission of Dengue virus is to combat the mosquito vectors," WHO advises and suggest ways through which it can be achieved.

· Prevention of mosquito breeding

Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification Applying appropriate insecticides to water storage outdoor containers

· Personal protection from mosquito bites

Using of personal household protection measures, such as window screens, repellents, insecticide-treated materials, coils and vaporizer and wearing clothing that minimizes skin exposure

Community engagement

Educating the community on the risks of mosquito-borne diseases

· Reactive vector control

Emergency vector control measures such as applying insecticides as space spraying during outbreaks may be used by health authorities.



Top coding skills that Google, Amazon, TCS, Infosys look for

Programmers need to have a wide range of skills to perform the many responsibilities. The most effective programmers combine knowledge, aptitude and technical capability with soft skills such as the ability to work as part of a team and to communicate well with others. Tech giants want to hire computer programmers who are able to demonstrate both types of skills.

Here are top 7 skills you need to master to land a job in big tech companies:

1. Proficiency with programming languages

Code is written in programming languages such as SQL, Java, C++, or Python. Programmers aren't expected to know every programming language in existence, but it would be beneficial to be proficient in at least two languages to increase your employment and career opportunities.

2. Learning concepts and applying them to other problems

The ability to learn concepts and apply them to other problems is an essential skill for programmers. This is especially useful when writing cascading style sheets (CSS), for which styles are applied to a web page's top-level, and then cascade to the other elements on the page.

3.Mathematical skills

Many aspects of programming require an understanding of math beyond the basic level. To become proficient at programming, you will need to have a thorough understanding of algebra and arithmetic.

4. Problem-solving capability

Code is often written to solve a problem. You will need to have the ability to identify problems and come up with the most efficient ways to solve them via programming.

5. Communication skills

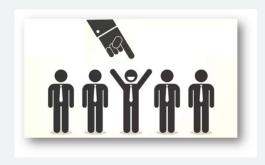
Programmers generally spend most of their time working solo in front of a computer. However, many situations require you to communicate with other programmers and team members, especially when working on large or complex projects. Excellent communication skills will enable you to work effectively with others and to share ideas and solutions.

6. Writing skills

As a programmer, you will also need to communicate your work or processes to other people from time to time. Often, processes and results will have to be communicated to other workers who may not have the level of programming knowledge that you have. Therefore programmers need to have good written skills.

7. Inquisitiveness

The most effective and successful programmers have a talent for figuring out how something is done and finding ways to do it more efficiently. A healthy degree of inquisitiveness will help ensure your consistent growth and development as a programmer.



India successfully test-fires surface-to-surface ballistic missile Agni-5

ndia successfully test-fired surface-to-surface ballistic missile Agni-5, the Ministry of Defence informed on October 27. The missile, which uses 3-stage solid-fuelled engine, is capable of striking targets at ranges up to 5,000 km with very high degree of accuracy.

"A successful launch of the Surface to Surface Ballistic Missile, Agni-5, was carried out on October 27 at approximately 1950 hrs from APJ Abdul Kalam Island, Odisha," the ministry said.

The successful test of Agni-5 is in line with India's stated policy to have 'credible minimum deterrence' that underpins the commitment to 'No First Use'.

The indigenously-developed surface-to-surface missile, Agni-5, is capable of striking a target more than 5,000 km. It is about 17-metre long, 2-metre wide and has launch weight of around 50 tonnes. The missile can carry a nuclear warhead of more than one tonne.

Unlike other missiles of Agni series, the latest one 'Agni-5' is the most advanced having some new technologies incorporated with it in terms of navigation and guidance, warhead and engine

Lot of new technologies developed indigenously was successfully tested in the first Agni-5 trial. The redundant navigation systems, very high accuracy Ring Laser Gyro based Inertial Navigation System (RINS) and the most modern and accurate Micro Navigation System (MINS) had ensured the Missile reach the target point within few metres of accuracy

The high-speed on board computer and fault tolerant software along with robust and reliable bus guided the missile flawlessly, an official said

India has at present in its armoury of Agni series, Agni-1 with 700 km range, Agni-2 with 2,000 km range, Agni-3 and Agni-4 with with 2,500 km to more than 3500 km range.

