Computer programming involves a broad set of activities that include planning, testing, and documenting. Most programmers participate in all of these phases of program development but focus on the coding process. Software engineers tend to focus on designing and testing activities.

The programming process begins with problem statement that helps you clearly define the purpose of a computer program. A good problem statement for a computer program has three characteristics:

* It specifies any assumptions that define the scope of the problem.
* It clearly specifies the known information.
* It specifies when the problem has been solved.

The known information in a problem statement is the information that you supply to the computer to help it solve a problem. Asss we can see programming is just given a computer instructions and in the same time it means that we brake a big task into the smaller ones.

There are 4 main paradigms:

1. Event-driven. It focuses on selecting user interface elements and defining event-handling routines that are triggered by mouse or keyboard activities

2. Procedural: Emphasis linear steps(instructions) which are solving your problem

3. OOP: formulates programs as a set of objects and methods that interact with each other to perform specific task

4. Declarative: focuses on using facts and rules to describe a problem.

Thousands of different programming languages have been created since the beginning of the 20th century, with many more being created every year. Before 1952, the only available programming language was machine language, now called a low-level language, that consists of nothing but the 0 s and 1 s with which the computer works. In 1952, a new low-level programming language called assembly language was introduced. It operates with short letter codes that stand for specific machine operations. A program called an assembler then translates these codes into machine language to be executed. In the 1960s, high-level programming languages emerged and now programmers can use simple English words and familiar mathematical expressions to code.

A program written in one of high-level programming languages is often called a source program and it can't be directly processed by the computer until it has been compiled, which means interpreted into machine code. The program produced after the source program has been converted into machine code is referred to as an object program. This is done by a computer program called the compiler. \

Object-oriented programming is one of the main programming methodologies, which is based on the idea that a program is a cluster of objects, each belonging to a certain class and the classes build up an inheritance hierarchy. OOP model organises software design around data, or objects, rather than functions and logic. An object can be defined as a data field that has unique attributes and behaviour.

Object-Oriented-Programing allows programmers to think of software development as if they are working with real-life entities.

Class: This is the model or standard about the capability of what an object can do. It is a template for a group of objects.

Method: It is a segment of code that defines an action. It can modify a class state that would apply across all the instances of the class.

Message: It activates Method.

Instance: It is like Object, however, within specific realisation.

Now let's speak about four principles of object-oriented-programming.

Encapsulation: it is binding data or objects within the class. In this class objects can communicate with each other.

Abstraction: It is extansion of encapsulation. It allows us to show only essential information and hide unnecessary.

Inheritance: That means basing objects or classes upon other objects and classes and using similar implementation in child objects.

Polymorphism: It is the ability of an object to take multiple forms

In my opinion the most popular languages nowadays are Java Python and Ruby

Java is a general-purpose programming language that is class-based and object oriented and designed especially for implementing all the possible dependencies. It allows developers to write once and run anywhere which means the compiled Java code has all the capabilities to run on every single platform that has the support of Java without needing recompilation.

Python is an interpreted, general-purpose, high-level programming language. The design philosophy of Python focuses on code readability with the use of significant whitespace. Python's language constructs as well as an object-oriented process for assisting developers in writing clear and logical coding for small as well as huge-scale projects.

Ruby is an interpreted, general-purpose, high-level programming language. It can be dynamically typed and makes use of garbage collection. Also, it provides full support for programming paradigms that covers object-oriented, procedural, and functional programming. The language is specially focused on faster software development and that's why called a "startup technology"

2 ЛЕСАН

**1)** The term "artificial intelligence" dates back to 1956 and belongs to a Stanford researcher John McCarthy. Basically, artificial intelligence (Al) is the ability of a machine or a computer program to think and learn. The concept of Al is based on the idea of building machines capable of thinking, acting, and learning like humans.

A more complicated definition is that artificial intelligence is an interdisciplinary concept that studies the possibility of creating machines capable of interacting with their environment and acting upon the received data in the manner considered intelligent.

First, it should be able to mimic human thought process and behavior. Second, it should act in a humanlike way — intelligent, rational, and ethical.

Al is not the same as machine learning. Although the two terms are often used interchangeably, they are different. Artificial intelligence is a broader concept while machine learning is the most common application of Al. We should understand machine learning as a current application of Al that is focused on development of computer programs that can access data and learn from it automatically, without human assistance or intervention. The entire machine learning concept is based on the assumption that we should give machines access to information and let them learn from it themselves.

Deep learning is a machine learning technique that teaches computers to do what comes naturally to humans: learn by example. Deep learning is a key technology behind driverless cars, enabling them to recognise a stop sign, or to distinguish a pedestrian from a lamppost. It is the key to voice control in consumer devices like phones, tablets, TVs, and hands-free speakers. Deep learning is getting lots of attention lately and for good reason. It's achieving results that were not possible before. That why Deep Learning not only learn data, but also analyze it using neural networks.

Speaking about the advantages of todays AI, there are intelligent gadgets able to recognize our speech ("understand what we want or need"), analyse the information they have access to, and provide an answer or solution.

Al is making headway in areas you might least expect it. The current state of artificial intelligence already allows for some basic robot writing. It might be not yet ready to compose in-depth articles or creative stories but does a pretty good job writing short and simple articles like sport recaps and financial summaries. Other examples of artificial intelligence in use today include smart home devices like Google's NEST, self-driving cars like those produced by Tesla, and online games like Alien: Isolation.

**2)** Virtual Reality (VR) is the use of computer technology to create a simulated environment. It is used in 3D movies and video games. It helps to create simulations similar to the real world and "immerse" the viewer using computers and devices like headsets and gloves. By simulating as many senses as possible, such as vision, hearing, touch, even smell, the computer is transformed VR is also used for training, education, and science.

Augmented Reality (AR) is a perfect blend of the digital world and the physical elements to create an artificial environment. AR uses computer vision, mapping as well as depth tracking in order to show appropriate content to the user. This functionality allows cameras to collect, send, and process data to show digital content appropriate to what any user is looking at. In AR, the user's physical environment is enhanced with contextually relevant digital content in real-time. You can experience AR with a smartphone or with special hardware.

VR and AR are two sides of the same coin. AR simulates artificial objects in the real environment, VR creates an artificial environment into a gatekeeper to this artificial world.

**3)** Game development is the overall process ofcreating a video game. And if you thought that making a video game is as easy as playing one, well, it's not. There are many components while creating a game such as Story, Characters, Audio, Art, Lighting, Level etc. that eventually merge together to create a whole new world in a video game.

Normally in video games texture can include various things like the game texture, game lighting, 3D modeling of characters / objects, particle systems to create fire, fog, snow.

Characters are a fundamental part of any video game. You have to decide the looks and personalities, how fast they should move, what should be manners and characteristics.

All good video games have various degrees of levels that increase the difficulty as time goes on. They can be denoted in games by multiple floors, different buildings, or even different countries and each degree can have many potential paths that eventually lead to the next level. And such design is a big factor in Game Development.

Audio is the backbone of video games! That means it should support the game and yet not be too obvious! You have to decide the various sounds in the game world like player sounds, background music, etc. that together create a lifelike and believable video game.

Lightning is obviously very important for mood setting. When it' s less, it' s an association with horror or games while increased one can denote more adventure or games. Also, it can be an important factor in stealth challenges with darker areas providing cover to characters.

Story can have a linear structure which is relatively easy, or it can even have a non-linear structure with various plot changes according to character actions. The main point is that there should be something interesting to hook your players.

РОБАТЫ

A robot is a computer that outputs motion instead of information. Robotics involves developing mechanical or computer devices than can perform many tasks that require a high degree of precision or are tedious or hazardous for human.

In general, robotic systems can do precise tasks accurately and consistently. The controlling software in robots is what is most important in terms of Al. The brain in an advanced industrial robot today works at about ten million instructions per second. To achieve human intelligence, the robot brain must achieve 100 trillion operations per second. The sensors can detect light, sound, touch and heat.

Robots have many applications in industry. Manufactures use robots to assemble and paint products. The robots do repetitive tasks without getting bored and careless. Robots are expensive, but they work 24 hours per day, do not go on strike, do not require health insurance and pensions.Companies like robots very much. As robots grow more capable, the opportunity for unskilled and semiskilled employment is sure to decrease.

Today robots are essential components of today's automated manufacturing systems, but they have found wide application outside the factory. We can see them in banks, restaurants, homes.

A robot must not only execute tasks programmed by the user but also be able to interact with its environment through its sensors and actuators.

Robots are powered through a combination of powerful technologies from the software and hardware world. While advanced engineering and robotics must develop all these robots, the software development community hasn't reached an agreement as to which is the best language to power these robots.

However, it's safe to say that there are various types of languages that you can learn to start working in robotics programming. That's because robots are programmed either by guiding or by off-line programming. The first one refers to how a robot is programmed to be guided from one point to another to cover all of the steps of an operation. Robots programmed like this follow a preloaded set of instructions.

For its part, off-line programming implies that the robot can receive instructions through a computer to act according to that input. These kinds of robots are mostly defined by tasks or objectives, so they need to be programmed through a combination of a high-level language. These include:

* C/C++: considered to be the best starting point for developers new to the robotics industry, these general-purpose languages allow interaction with low-level hardware and provide real-time performance.
* Python: this is a high-level language that's great to automate, teach, and postprocess robotic applications. Its main strength resides in its capability to write scripts that calculate and simulate the entire robot program. This saves you from manually teaching every statement to the robot. Python can write sophisticated software with fewer lines of code and it has a lot of robotic frameworks that can save you a lot of time.
* Java: another popular choice to work on robotics, Java offers you a series of APIs (Application Programming Interface) that were specifically created for robotics.

Of course, the more languages you know, the better, as robotic programming uses a lot of different types that take care of different aspects of a robot.