# Introduction to programming languages chen 5th edition pdf

Jure is the founder of Codequickie and WhistleX. He likes technology, sports and computer games. Everyone says that programming languages are similar, but how similar? Does that mean that if you know a programming language, you can all the others? The most frustrating thing is choosing between two programming languages that are similar, but are they? Yes, the programming languages are similar, but not so much. The basics of each programming language are about the same, but how you write and use these basics to solve problems is very different for each programming language. Let's explain it a little more. How similar are programming languagesHow similar programming languages really depend on the programming languages you are looking at. For example, if you compare how to define a variable, which is pretty much a most basic piece of code that you can write, in JavaScript it looks something like this:song word = Hello; And in Python it looks something like this:word = HelloAs you can see, it does not look too much different. The only difference is that you must use this to allow prefixes in JavaScript before defining a variable and a semicolon at the end. Let's take a look at another example, an if statement. If statement is the most used piece of code in the world. It goes basically, if something is true or is false, do something. In JavaScript it looks something like this:if (hour < 18) { let greeting = Good day;} In Python, it looks something like this:about hour < 18: greeting = Good dayAgain, not too much different. In JavaScript, put your state inside the parentheses, and python does not use parentheses. You need to let to define a variable and a semi-colon, which is something like a full stop at the end of a sentence. These very just two examples of how different the basics are. The so-called basics or syntax are specific to each programming language you saw above, but the concept is the same. If you understand an if statement in JavaScript, with a little thinking you understand it in Python.Om you want to know what the basic syntax looks like for each popular programming language, you can go to W3School and check. Also, keep in mind that here I am comparing

Python and JavaScript, which similarity on the scale of 1-10 is about 5 or 6. C++ and JavaScript would be about 9 or 10.Also, Python and JavaScript are mostly used for the same things. If you were to take a programming language like Swift, which can only be used to make iOS apps and Java, used almost exclusively for Android development code would look very different. There would be very little handover knowledge from one language to another. What programming languages are similar As I have said above, not all programming languages are equal, some are very different and some are almost the same, are the ones we're going to take a look at. Firstly, we need to take a look at the use of certain programming languages, which greatly affect their similarity. If a programming language is used only for web development it will not resemble languages used to make Android apps. JavaScript and C++ are two languages that are very similar. They can be used to make the same things and code looks very similar. The only difference is that C++ is's lower level programming language, which means it's a little less optimized for people to use it. You know that your computer uses 1 and 0, keep in mind that ass lowest possible programming language. That will C++, and then JavaScript.The higher the language is, the easier it is for people to use it. Python, JavaScript and Java are also similar, their code does not look the same, but they are used for the same things and are just as difficult to use. Some programming languages like PHP are completely isolated, they don't have many similarities to other programming languages, and their code looks very different. Basically, if the programming languages are used for the same things, they are very similar and you won't have to do much learning to transition from one to another. The next question that you may have after you have chosen a programming language for your needs is where you should learn it. I think if you have some money, courses are a good option. You can check this article where you can find my article on the best programming courses that I recommend for every beginner starting to learn how to encode. ConclusionI hope this makes it clear to you that you won't need much time to transition from one programming language to another as long as you want to do the same things with them. If you think I've missed something, just post your question in the comments below. Now you know that if you think between two programming languages, you can choose either of them as long as the same things can be done with both of them. Do you know multiple programming languages? Do they look like you? Join Hacker Noon Create your free account to unlock your personalized reading experience. Many of us have, at some point, dreamed of creating a programming language that redefines the way we develop software. And most of us have also come to accept the fact that such a feat, if not completely impossible, is very difficult to accomplish. Over the past few years, I've read a lot about languages and compilers, and I've identified a list of components that helped the most popular and powerful programming languages become what they are today. While it is still highly unlikely that you will create the next C or Java, you have no realistic chance of achieving such a high goal without paying attention to the following list. So, without further ado... Let's start!#0: Right is Made BeforehandEvery project needs a defined direction, and if you don't know what the point of your language is, you will end up nowhere. Ask yourself the following questions to determine the value and scope of your new language:Why are you designing a completely new language? What problem(s) (preferably much more than just one) will be solved by re-inventing the wheel? Are the benefits of your language promising enough to convince businesses and developers to move from established, more mature tools to relying on the ones you're going to build? How will you fund your project? If your project is open source, where do you get funding? Donations? Will you be backed by a large company? Or will you be supported solely by your motivation to create a viable language? What is the goal of your language? Web? Built-in systems? General-purpose? What styles will your language facilitate? Will you support multiple programming paradigms, or will you force developers to fit into one? How are you going to spread the word about your language? What will you do to promote your effort, and garner public support?#1: Familiarity and AccessibilityLet's be honest — no one wants to learn a whole new syntax just to be able to produce a program in your language. Try to follow general conventions that appear across a wide range of languages. Many languages have adopted functions in C syntax, such as braces, parentheses for functions, and keywords as if or for. Something like the following, while exaggerated, is a total rejection of established conventions, and as a result is difficult both to read and write:FUNCTION main <INTEGER argc,= string= argv()=> <INTEGER>input effect [ std>>cout:Hello, world! + std>>endl;] You don't want to be too detailed, either (look at you, Java!):p ublic static function main requires input(int, char**) producing output(int) { using System and its out property, call the print with (Hello, world!); finish with result 0;} A language must also be easily accessible to all users. While a platform-specific tool like MASM only needs to deploy a Windows install, a language designed to run on all major operating systems needs to provide headache-free installation options for each one. For example, to get started with developing PHP on a new computer, all you have to do is run the appropriate installer for your OS, and open a text editor. If you support Windows, it never hurts to provide a good development experience. Ruby famously sucks on Windows (mostly because no one uses it on Windows), and Dart didn't even provide an official installer for Windows.#2: Actively MaintainedCommit speeds of some web languages and tools (credit: 中])Pascal was a good language back in its heyday. It was Ada. Fortress too! So why aren't they popular in 2017? The answer is simple:</INTEGER> </INTEGER> </INTEGER> actively maintained. No matter what happens in the future, what technological advances we are making, or how consumer needs change, none of the aforementioned can ever again evolve to reflect it, because their code bases are static. No one is working on a Pascal compiler in 2017. No matter what errors you encounter in your development, you're stuck with, or have to write a solution too on your own. Active maintenance means that Github issues don't sit out of date for months or years at a time, and it also means that developers and businesses can have more confidence relying on your tools. And as an added bonus, people will want to use your project because they can see effort is still being made to keep it up to date!#3: Fail-fast and Descriptive error messagesElm friendly error messages. Everyone can agree that runtime errors suck. They are costly, difficult to track down, and in most cases completely preventable. An error-fast system works to diagnose runtime errors before they ever occur. In the end, this can save you time, headaches and money. The better your language toolkit is at detecting and preventing errors, the more attractive it will be for new developers. Elm's success as a web development language can be partly attributed to the descriptive error messages produced by its compiler. Not only does it detect type mismatches, but it also detects misspelled variable names. The more detailed the error messages, the easier it is to reduce bugs before they even reach your application.#4: Type SafetyType security makes it easier for a language to fail quickly. How many times have you seen an error like this? NoSuchMethodError: Class 'Wtf' has no instance method 'IsThisNonsense'. Receiver: Instance of 'Wtf'Tried calling: IsThisNonsense()In highly enrolled languages, such as Java, such errors can always be analyzed and captured at compile-time. The debate over strongly written versus dynamically written languages is unlikely to take, but I personally recommend strong type checking. If you can catch each type error on compile-time, you don't need to add overhead of runtime type controls to your final products.#5: Versatile ToolingMicrosoft's Visual Studio line provides the highest quality tools for a variety of languages, especially C#. Good tools save time. Good tools save money. Good tools save lives. Ok, good tools might not really save lives, but it can't be denied that a language with adequate tools is more productive to work with, and generally a more enticing choice than a language where you are left practically on your own.C# is a good example of proofing tools. . The NET framework includes not only a robust compiler, but also il byte code troubleshooting and decompilation tools. Combined with Roslyn, NuGet and Visual Studio, the C# development experience is one where pretty much everything for you.#6: MetaprogrammingThe MetaprogrammingThe future-proof language can cope with evolution over time. If developers have to wait until a new SDK version implements a crucial feature, then they will leave your platform, and select one where the feature is already present. According to Wikipedia:Reflection is the ability of a computer program to investigate, introspe, and change its own structure and behavior at runtime. Giving users a vehicle through which they can add language features themselves is a great way to keep them longer. And in some cases, usually metaprogrammed libraries are customized as language functions themselves. For example, ES6 introduced it extends keywords to JavaScript, and eliminated the need to use third-party libraries to extend object prototypes.#7: Vibrant CommunityThis one is mostly out of your control, but is also one of the most important steps on your way. A thriving community can be a magnetic factor that draws people to your language. If it's all crickets and tumbleweeds, you'll face difficulties gathering an audience for your project. Just think about: who wants to use a language that no one talks about, writes libraries for, or can answer questions about? Not me. Not you. Not anyone else. Ruby is notoriously a pain on Windows because the overwhelming majority of its community uses Mac or Linux. How do I get Jekyll up on Windows 7? Who knows? Nobody.Today's trend JavaScript repositories at Github.Community business is also a decent gauge of the amount of people using your language. The more people who use your language, the more likely someone will look for support or answers, and for somewhere to find them. JavaScript is the most popular programming language on this planet, and it's clear to see. Of Github's trending repositories, at least half are written in JavaScript, every day. There are thousands of JavaScript Gitter and Slack rooms, and it is one of the most common languages taught at coding camps.#8: In-depth DocumentationThis is a no-brainer. Every programmer runs into errors while encoding, and these errors are often exacerbated by a lack of adequate documentation of APIs that failed. Do all a favor — document public APIs. A language you're building should also make documentation a first-class feature, rather than trying to patch it up after releases. Something like Javadoc will work. Darts are a great example of documentation support — the dart SDK includes a static website generator documentation, and each package uploaded pub repositories has documentation generated and hosted on site.#9: Stability through VersioningNobody will migrate to your language if any new change introduced is a breaking change, which can be very expensive. Enforcing strong versioning principles allows developers to update without fear of unholy retaliation in the hands of the API gods. is a popular system of rigid rigid limitations, and by adhering to IT conventions, your language can be virtually future-proof. For example, Dart's Pub package managers install dependencies by resolving SemVer restrictions to appropriate versions of libraries. If you choose to commit to SemVer, your package manager (or whatever similar tool you use) can be written to compare library sources to previous versions to ensure that SemVer is followed. This is something of an extreme, as many developers would prefer to just publish packages, without an angry tool nagging them to rename an API. But if you do, it would be a great way to force package version numbers to reflect on the changes they present, and prevent unforeseen program breaks after updates.#10: Library SupportNPM has a massive number of JavaScript packages available on their servers. Aside from syntax and tools, perhaps the deciding factor in switching to a new language stack is its ecosystem. NPM has over 400,000 JavaScript libraries available to the public. No matter what additional functionality you need in your node.js apps, you can be sure that someone else has already implemented it for you. New languages are very much disadvantaged here, simply because they have not been around long enough for developers to publish a comparable amount of libraries. Thus, if you aim to keep users around, you need to provide a variety of functionality out-of-the-box. Darts (I think you can see my bias against this language!) takes a battery-included approach, and provides a massive standard library that removes a lot of the need to have a quarter of a million packages up to its package manager. Functionality like left-padding strings has been around for ages now, and it's also an arduous task to remove Pub packages, so if some developers decide to pull a package, the entire Internet won't break.#11: Effective memory usage and ConcurrencyApplications in scale are at high risk of crashing, in general. Simply put, it takes a lot of resources to handle high traffic and expensive operations. To make matters worse, memory management is a PITA to manually implement. Although it may not necessarily be a feature of the language itself, your compiler/interpreter/vm should attempt to prevent memory leaks, buffer overflow, and other memory failureerrors. Most modern virtual machines, such as JWC, . The NET runtime and dart Vm implement memory management through garbage collection, and as a result, developers of the corresponding language don't have to worry about allocating memory or dropping pointers. Multithreading is also a common technique for running asynchronous code in a parallel way, and thus, simultaneous operations should be trivial to perform, and require little to no extra standard code. For example, Google's Go language baked right into the language itself:func main() { where was chan string = make(chan string) go pinger(c) go ponger(c) go printer(c) was input string fmt. Scanln(&input)}#12: TestingIt is well known that the maintenance phase is the longest phase of the software development lifecycle. Test-driven development is a common process that assures the quality of produced software, but it also relies heavily on the ability to write very specific unit tests to verify success in various use cases. The better suited your language is to test, the less bugs will be encountered at runtime, and the more trusted your language is for production. A good idea is that the team behind the language to publish the test tool, but using community-supported, mature test libraries (like JUnit, Mocha or Cucumber) is also a viable strategy.#13: Portability and ModularityJava run on a wide variety of platforms, including those that are less than an actual cup of java (image credit: Robert Savage). Not all languages must be portable, but those targeting multiple platforms need well-designed systems to allow the reuse of code between systems. Most, unless all languages have some kind of import keywords that will allow you to withdraw code from other files. A modern language must go beyond simply using imports to divide large files apart, and to actually implement some kind of modular system. Modularity enables developers to explicitly separate logic, and also allows to use certain parts of libraries across all platforms. Darts and ES6, for example, implement modular systems. Modular systems also make it easier for compilers to remove unused code, and ultimately reduce the output size of compiled code. This is the key for languages that aggregate to Javascript, which has less code interpreted on the client side going a long way to preventing the main bottleneck in browsers.#14: Established StandardsPublic standards can go a long way to making your language more stable, and more productive in team environments. A serious language will have a thorough specification available to read on a free online platform (Example: Dart ECMA specification). Consider implementing a configurable linter and formatter, and provide it as part of your language's default toolset. Eventually, the standards will be roasted in the developers' brains, and joining new commercial teams or open-source projects will be an easier experience. For example, Dart ships with both a linter and formatter. You might even consider refusing to compile/run code that is poorly formatted. This is a bit extreme to bake into a compiler, but the project authors may consider including formatting/linting controls in presubmit scripts to make sure that all commits are readable and understandable. Example with ESLint:// package.json{ scripts : { prepublish: eslint **/*.js }}#15: Unicode developers need to remember: Not everyone in the world speaks English. Aid only characters effectively turn off millions of potential developers, and also prevent anyone in a country where English is not the dominant language from ever using an application developed in yours. If something like the following (credit: Nick McCurdy) is possible in Java, why wouldn't your language support Unicode?#16: Backed by a large companyThis is not necessarily required, but if a large company backs your language, you automatically secure several advantages: Credibility — People will see that a large company uses your language in production, and rest assured that it can handle modern requirements. Financing — Because your language operates multi-million dollar applications, the company has an incentive (really an obligation) to provide the resources necessary to ensure that the language stays afloat, and adapts to fit growing needs. Emotional Validation :) — Building a language is by no means an easy task; it takes hours after hours of laborious work that sometimes feels unthankless. A large company that uses your language assures you that your efforts were not in vain, and more importantly, tangible proves to you that people actually use your language. This is an important factor, if not the most important factor, in keeping languages like Java, Go, Dart and PHP actively maintained and regularly updated. If your language takes off, you can consider pitching it to businesses, giving calls on developer meetups, or even running it at the base of your own applications. It's the end of this list. Sure, you can try all of the above suggestions and still fall flat, but it's still worth a try at the end of the day. Take what you've learned, and go make that pipe dream a reality! Thanks for reading! Liked the post? Feel free to show a little ❤ with a press of the green button! :)About AuthorTobe O. is a 17-year-old programmer whose favorite language must be darts. When he's not in school, he plays sports, makes music, or works on angel server frame (check it out — no, really!). Find him on Twitter! Join Hacker Noon Create your free account to unlock your personalized reading experience. Experience.

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