Homeworks

CSI 513: Concepts of Programming Languages

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Q1. Discuss and explain the different Programming languages used in most popular websites

. JavaScript

There is no doubt that JavaScript is the King of web development and probably the most popular language among web developers. It's also the only language that allows you to create web applications, both frontend, and backend as well as mobile applications (React Native).

The strength of Javascript is not just it can run on browser and server using Nodejs but also the awesome frameworks and libraries it has for web development and app development.

For example, you can use React.js and Angular for frontend, Nodejs for backend, and React Native for creating cross-platform (both Android and iOS) mobile apps.

2. Python

Python is another language which has gained a lot of popularity in recent year. While it's not exactly new and has passed the test of time, it's probably the most versatile programming language at the moment.

You can use Python for web development, Data Science, Scripting, and Automation. Similar to JavaScript, Python also enjoys huge community support and has a lot of useful frameworks, libraries, and tools that can help you create a web application in a quick time.

For example, you can use Django to create full-stack web applications. If you want more control, you can also use Flask, a minimalist web development framework.

Python is also a good programming language to learn Coding, so if you are new to the software development world then choosing Python can be a great start, not just for web development but for an overall programming career. Now

3. TypeScript

TypeScript is my personal favorite and a modern programming language for web development. Just like we have C and C++, TypeScript can be considered as JavaScript++ though it's not as popular as C++.

The good part of TypeScript is that it adds type-safety in JavaScript code which means you can catch nasty JavaScript type-related errors in the development phase.

It also makes developing object-oriented code easy for JavaScript and several inbuilt debugging tools of TypeScript make web development really easy.

If you have to choose a modern programming language to learn in 2022, I highly recommend you to learn TypeScript and if you need a resource, Understanding TypeScript by Maximillian Scwarzmuller and AcadMind is a great course to start with **on Udemy.**

4. PHP

I may get a lot of flaks for including PHP in this list of best programming languages for web development in 2022 but to be honest, PHP is one of the best programming languages when it comes to creating web applications.

It's a dynamic, server-side scripting language that makes it really easy to create fully functional web applications. If that's not enough, half of the internet is running on PHP's shoulder, remember WordPress, the most popular web application software is made on PHP.

PHP also has frameworks like Laraval, which is both powerful and allows you to swiftly create web applications using a model–view–controller architectural pattern.

Don't listen to people who say PHP is not useful, if you find it easy, go for it, and If you are want to learn PHP for web development in 2022 and need a resource, I highly recommend PHP with Laravel for beginners — Become a Master in Laravel course from Udemy. A great online course to learn both PHP and Laravel in depth.

5. Ruby

Ruby is another programming language that is really great for web development. Similar to PHP and Python, Ruby is also easy to learn and goo for beginners.

What makes Ruby special for web development is the Ruby on Rails framework which powers websites like Github, Shopify, Airbnb, Groupon, GoodReads, and Kickstarter.

If you don't know, Rails is a model–view–controller (MVC) framework, providing default structures for a database, a web service, and web pages. It encourages and facilitates the use of web standards such as JSON or XML for data transfer and HTML, CSS, and JavaScript for user interfacing .

Q2. What is Data Science: Lifecycle, Applications, Prerequisites and Tools?

What Is Data Science?

Data science is the domain of study that deals with vast volumes of data using modern tools and techniques to find unseen patterns, derive meaningful information, and make business decisions. Data science uses complex machine learning algorithms to build predictive models.

The data used for analysis can come from many different sources and presented in various formats.

Now that you know what data science is, let's see why data science is essential to today's IT landscape.

The Data Science Lifecycle

Data science's lifecycle consists of five distinct stages, each with its own tasks:

1. Capture: Data Acquisition, Data Entry, Signal Reception, Data Extraction. This stage involves gathering raw structured and unstructured data.
2. Maintain: Data Warehousing, Data Cleansing, Data Staging, Data Processing, Data Architecture. This stage covers taking the raw data and putting it in a form that can be used.
3. Process: Data Mining, Clustering/Classification, Data Modeling, Data Summarization. Data scientists take the prepared data and examine its patterns, ranges, and biases to determine how useful it will be in predictive analysis.
4. Analyze: Exploratory/Confirmatory, Predictive Analysis, Regression, Text Mining, Qualitative Analysis. Here is the real meat of the lifecycle. This stage involves performing the various analyses on the data.

5. Communicate: Data Reporting, Data Visualization, Business Intelligence, Decision Making. In this final step, analysts prepare the analyses in easily readable forms such as charts, graphs, and reports.

Prerequisites for Data Science

Here are some of the technical concepts you should know about before starting to learn what is data science.

1. Machine Learning

Machine learning is the backbone of data science. Data Scientists need to have a solid grasp of ML in addition to basic knowledge of statistics.

2. Modeling

Mathematical models enable you to make quick calculations and predictions based on what you already know about the data. Modeling is also a part of Machine Learning and involves identifying which algorithm is the most suitable to solve a given problem and how to train these models.

3. Statistics

Statistics are at the core of data science. A sturdy handle on statistics can help you extract more intelligence and obtain more meaningful results.

4. Programming

Some level of programming is required to execute a successful data science project. The most common programming languages are Python, and R. Python is especially popular because it's easy to learn, and it supports multiple libraries for data science and ML.

5. Databases

A capable data scientist needs to understand how databases work, how to manage them, and how to extract data from them.

Applications of Data Science

Data science has found its applications in almost every industry.

1. Healthcare

Healthcare companies are using data science to build sophisticated medical instruments to detect and cure diseases.

2. Gaming

Video and computer games are now being created with the help of data science and that has taken the gaming experience to the next level.

3. Image Recognition

Identifying patterns in images and detecting objects in an image is one of the most popular [data science applications](#).

4. Recommendation Systems

Netflix and Amazon give movie and product recommendations based on what you like to watch, purchase, or browse on their platforms.

5. Logistics

Data Science is used by logistics companies to optimize routes to ensure faster delivery of products and increase operational efficiency.

6. Fraud Detection

Banking and financial institutions use data science and related algorithms to detect fraudulent transactions.

Data Science Tools

The data science profession is challenging, but fortunately, there are plenty of tools available to help the data scientist succeed at their job.

- Data Analysis: SAS, Jupyter, R Studio, MATLAB, Excel, RapidMiner
- Data Warehousing: Informatica/ Talend, AWS Redshift
- Data Visualization: Jupyter, Tableau, Cognos, RAW
- Machine Learning: Spark MLib, Mahout, Azure ML studio

References:

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