Basics of Computer Coding Resource Guide

The ability to write computer programs is an important skill that is needed within numerous disciplines, and an understanding of the fundamentals of a computer language is essential. This handout will provide a list of online resources that cover the basics of the following programs and languages: C++, Python, JavaScript, Java, and MATLAB.

You can navigate to specific sections of this handout by clicking the links below.

C++

C++ is a foundational computer program in the industry. It is used in a variety of disciplines, such as engineering, computer science, and information technology. Becoming comfortable with C++ will enable users to program in a variety of other languages built upon the language, such as C# and Java.

C++ Resources

- *Documentation* - Some programming languages provide a website or built-in resources which are typically called the program's documentation. For students with questions about C++, they should first reference the documentation. Published C++ tutorials can be found on the official C++ website under the "Resources" and "Tutorial" tabs on the left-hand side of the homepage. The following links can also be used to access this documentation:

  - http://www.cplusplus.com/reference/

  - http://www.cplusplus.com/doc/tutorial/

- *Compiler* - C++'s debugging phase can be tedious. To make debugging easier, users should write and run their program using an application called a compiler. A compiler will allow the user to identify lines of a program that are causing problems to the code. A well-known compiler is Code::Blocks. The Code::Blocks installation instructions can be found on the official C++ website using the "Code::Blocks" link under the *Compiler* tab. Code::Blocks can also be accessed through the following link:

    - http://www.cplusplus.com/doc/tutorial/introduction/codeblocks/

- *YouTube* - Students seeking additional assistance with writing C++ programs may find YouTube to be a valuable resource. One YouTube playlist, published by the channel ProgrammingKnowledge and entitled *C++ Programming Tutorial for Beginners (For Absolute Beginners),* begins with the basics of installing Code::Blocks, discusses basic C++ functions, such as 'for loops' and 'while loops,' and then proceeds into more advanced topics, such as classes and data structures. The following link can also be used to access this playlist:

    - https://www.youtube.com/playlist?list=PLS1QulWo1RIYSyC6w2-rDssprPrEsgtVK

- *Tutorialspoint* - Students seeking help via guided hands-on practice may find the website Tutorialspoint to be useful. This website offers tutorials on many computer languages paired with interactive examples and sample problems that allow students to practice their understanding of the language before programming in that language. By clicking on the Library icon on the website's main page, the user will be able to access a large collection of Tutorialspoint resources. The link entitled "Learn C++" located under the *Computer Programming* section includes the reference page for all of the C++ tutorials. Tutorialspoint C++ resources can also be accessed through the following link:

    - https://www.tutorialspoint.com/cplusplus/

Python

Python is an object oriented program used across many disciplines. It has a unique syntax that is designed to be easy to read. While this requires less effort for new students to learn, it can produce confusion for students who have previously learned another language such as C++ or Java. Because of its readability and use in a variety of applications, Python is perhaps one of the most commonly used computer languages.

Python References

- *W3schools* - W3schools is a helpful site with resources for a variety of computer languages. The site's Python portion includes tutorials and examples that allow users to practice writing programs. Many of its tutorials cover specific topics that help the user learn the material in smaller pieces. After each example, there are sections entitled "Test Yourself with Exercises"; these allow users to practice their skills and have their work checked automatically by the website. The following link can also be used to access W3schools's Python resources:

    - <https://www.w3schools.com/python/>

- *YouTube* - Students looking for a verbal or auditory explanation may find the YouTube playlist *Python Programming Tutorials (Computer Science)*, published by the channel Socratica, to be helpful. This playlist contains over 30 videos that cover a range of topics within Python from basic to advanced. This playlist can also be accessed through the following link:

    - <https://www.youtube.com/playlist?list=PLi01XoE8jYohWFPpC17Z-wWhPOSuh8Er->

- *Tutorialspoint* – By clicking the Library icon on the website's main page will lead the user to a large collection of the Tutorialspoint resources. The link entitled "Learn Python"

located under the *Python Technologies* section near the bottom of the page includes the reference site for all of the Python tutorials. The following link can also be used to access Tutorialspoint Python resources:

- https://www.tutorialspoint.com/python/index.htm

JavaScript & Java

Although JavaScript and Java have similar names and are based on the C language, their functions are quite different. JavaScript uses basic programming to develop webpages and make them more interactive. Java, on the other hand, is an object-oriented programming system similar to C++. It can be used to write many different types of programs.

JavaScript Resources

- *W3schools* - In addition to Python resources, W3schools also offers many of the same tools to help students learn JavaScript coding, such as helpful, interactive examples and practice questions. W3schools is a better option for novice users looking for practice with JavaScript. Using the link entitled "Learn JavaScript" under the website's *Tutorials* tab, students can find basic instructions for foundational JavaScript concepts. W3schools's JavaScript resources can also be accessed through the following link:

  - https://www.w3schools.com/js/default.asp

- *Documentation* - While JavaScript does not have an official documentation site, Mozilla has created a programming reference site, entitled MDN, which has a similar function of documentation for JavaScript. This site provides reference tools, user guides, and a wide variety of program-specific resources. On the MDN homepage, clicking on the "JavaScript" link located under the *Technologies* tab on the top of the page will redirect the user to the website's JavaScript page. Selecting the "References" button located on the left of this page will bring the user to a comprehensive reference library; the setup is

similar to a documentation reference. The following link can also be used to access JavaScript's documentation:

- o https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference

- *Tutorialspoint* – By clicking the Library icon on the website's main page, the user will be able to access a large collection of Tutorialspoint resources. The link entitled "Learn JavaScript" located under the *Scripts* section holds the reference page for all of the JavaScript tutorials. Tutorialspoint JavaScript resources can also be accessed using the following link:

- o https://www.tutorialspoint.com/javascript/index.htm

Java Resources

- *Documentation* - As is typical for many programming languages, Java also contains a documentation site. This site is difficult to navigate because users will need to have a general idea of Java's concepts and terms. The website is published through Oracle and is entitled *JDK 12 Documentation.* The following link can also be used to access Java's documentation:

- o https://docs.oracle.com/en/java/javase/12/

- *Tutorialspoint* - By clicking the Library icon on the website's main page, the user will be able to access a large collection of Tutorialspoint resources. The link entitled "Learn Java" located under the *Java Technologies* section includes the reference page for all of the Java tutorials. Tutorialspoint Java resources can be accessed through the following link:

- o https://www.tutorialspoint.com/java/index.htm

MATLAB

MATLAB is a programing language that is commonly used in engineering courses and is often utilized to calculate and graph data. MATLAB has similar commands and functions to C++, but the syntax is slightly different.

MATLAB Resources

- *Documentation* - Like C++, MATLAB has built-in documentation and a help function that will search its online database for relevant information. The documentation site entitled *MathWorks* is the best place to find answers on MATLAB. Using the support tab located at the top of the site's menu, users can click on the documentation link and choose MATLAB as the program they wish to explore. This page contains links leading to detailed instructions on the operation of the MATLAB language. The following link can also be used to access MATLAB documentation:

  o https://www.mathworks.com/help/matlab/.

- *YouTube* - Students who prefer visual and auditory instruction may find the YouTube playlist, *MATLAB for Absolute Beginners*, helpful. This MATLAB YouTube playlist can be accessed through the following link:

  o https://www.youtube.com/playlist?list=PLYmlEoSHldN4bz5WY7e0OvXQ90E_xUOmz

- *Tutorialspoint* - By clicking the Library icon on the website's main page, the user will find a large collection of the Tutorialspoint resources. The link entitled "Learn MATLAB" located under the *Computer Programming* section holds the reference page for all of the MATLAB tutorials. The following link can also be used to access Tutorialspoint MATLAB resources:

  o https://www.tutorialspoint.com/matlab/index.htm