BUSINESS & COMPUTER SCIENCE/BUSINESS MANAGEMENT
Computer Programming with Python
Unit 6: Functions

Essential Understandings	▪ Abstraction involves taking a very large unmanageable project and breaking it down into smaller pieces or functions that can later be pieced together into a working (larger) program. ▪ At first, using functions that pass arguments (or values) often seems inconvenient and unnecessary to inexperienced programmers, but it is a key to creating reusable solutions that are safe, focused, and intentional. ▪ Efficient and effective larger programs are composed of numerous functions each of which usually performs a single job.
Essential Questions	▪ How are well designed functions similar to Lego blocks or Tinker Toys? ▪ How do functions help programmers (and end users) work with abstractions rather than details? ▪ Why is it always better to return information through (parameters) a function than just creating numerous global variables?
Essential Knowledge	▪ Functions help one test parts of a larger program to be confident that they work independently before they are assembled into parts of larger working programs. ▪ If one can learn to pass values or data in variables into functions using parameters then users don't have to actually understand the function to make use of it (i.e., one uses square root, exponent and other functions on a calculator without always knowing why they work).
Vocabulary	▪ <u>Terms</u>: 　○ abstraction, functions, parameters, global variable, return values
Essential Skills	▪ Write functions. ▪ Accept values into functions through parameters. ▪ Return information from functions through return values. ▪ Work sparingly with global variables and constants. ▪ Create a computer opponent that plays a strategy game.

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Related Maine Learning Results	Mathematics
	A. Number
	   Real Number
	   A1.Students will know how to represent and use real numbers.
	      a. Use the concept of nth root.
	      b. Estimate the value(s) of roots and use technology to approximate them.
	      c. Compute using laws of exponents.
	      d. Multiply and divide numbers expressed in scientific notation.
	      e. Understand that some quadratic equations do not have real solutions and that there exist other number systems to allow for solutions to these equations.
	D. Algebra
	   Functions and Relations
	   D4.Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques.
	      a. Recognize the graphs and sketch graphs of the basic functions.
	      b. Apply functions from these families to problem situations.
	      c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values.
	      d. Use the concepts of average rate of change (table of values) and increasing and decreasing over intervals, and use these characteristics to compare functions.

Sample Lessons And Activities	▪ Create *Global Reach* program that teaches how to reach and modify global variables safely (only when you really intend to) within functions.
Sample Classroom Assessment Methods	▪ Create a *Tic_Tac_Toe* program
Sample Resources	▪ Publications: o Python Programming for the Absolute Beginner – Michael Dawson