# **Assignment xx Algorithmic Design Document**

Make a copy before you begin (File -> Make a copy). Add the Assignment # above and complete the sections below BEFORE you begin to code and submit with your Assignment to D2L (File -> Download -> PDF). The sections will expand as you type.

## zyBooks

Add your zyBooks screenshots for the % and assigned zyLabs completions below. Required percentages: all assigned zyLabs, Challenge Activity with at least 70%, and Participation Activity with at least 80%.

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| **zyLabs, Challenge, and Participation % Screenshot:** |
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| **Assigned zyLabs completion Screenshot:** |
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## Assignment

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| **Program description:** |
| This program will take the number of large and small pizza’s you are ordering, calculate how much the total order will be, and provide an itemized cost breakdown. |

Before you begin coding, **you must first plan out the logic** and think about what data you will use to test your program for correctness. All programmers plan before coding - this saves a lot of time and frustration! Use the steps below to identify the inputs and outputs, calculations, and steps needed to solve the problem.

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| **Algorithmic design:** |
| 1. Identify all of the user input. What are the data types of the inputs? Define the input variables. |
| We will require 2 inputs;  1. A whole number of large pizza(s) intended to be purchased  2. A whole number of small pizza(s) intended to be purchased |
| 1. Describe the program output. What is displayed to the user? What are the data types of the output? Define the output variables. |
| The program will output an arithmetic sum calculated from the supplied input values |
| 1. What calculations do you need to do to transform inputs into outputs? List all formulas needed, if applicable. If there are no calculations needed, state there are no calculations for this algorithm. |
| Simple multiplication:    Small pizza cost = numSmall \* costSmall  Large pizza cost = numLarge \* costLarge  Simple arithmetic:  Total pizzas = numSmall + numLarge |
| 1. Design the logic of your program using pseudocode or flowcharts. See pseudocode syntax at the bottom of this document. Here is where you would use conditionals, loops, functions or array constructs (if applicable) and list the steps in transforming inputs into outputs. Walk through your logic steps with the test data from the assignment document. |
| START  DECLARE Int costSmall = 5  DECLARE Int costLarge = 9  DECLARE Int numSmall = 0  DECLARE Int numLarge = 0  DECLARE Int sumTotal = 0  DISPLAY “Hello! Welcome to the pizza cost calculator.”  DISPLAY “Please input the number of small pizza’s being ordered: “  INPUT Int numSmall  DISPLAY “Please input the number of large pizza’s being ordered: “  INPUT Int numLarge  SET Int sumTotal = (numSmall \* costLarge) + (numSmall \* costLarge)  DISPLAY “You are ordering “, numSmall, “ small pizzas“  DISPLAY “You are ordering “, numLarge, “ large pizzas“  DISPLAY “Order total: $”, sumTotal  DISPLAY numSmall, ” pizza(s) at $5/unit is: “, (numSmall \* costSmall)  DISPLAY numLarge, ” pizza(s) at $9/unit is: “, (numLarge \* costLarge)  DISPLAY “Thank you for using this calculator! Please report any bugs found.”  END |
| 1. Include 2 Sample Program Runs for your program using your own set of data. This data set must be different from my Sample Runs in the Assignment document. This process is similar to Unit Testing and will help you test your program better. |
| Sample Program Run 1:    Sample Program Run 2: |

## Pseudocode Syntax

Think about each step in your algorithm as an action and use the verbs below:

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| **To do this:** | **Use this verb:** | **Example:** |
| Create a variable | DECLARE | DECLARE integer num\_dogs |
| Print to the console window | DISPLAY | DISPLAY “Hello!” |
| Read input from the user into a variable | INPUT | INPUT num\_dogs |
| Update the contents of a variable | SET | SET num\_dogs = num\_dogs + 1 |
| **Conditionals** | | |
| Use a single alternative conditional | IF *condition* THEN  *statement*  *statement*  END IF | IF num\_dogs > 10 THEN  DISPLAY “That is a lot of dogs!”  END IF |
| Use a dual alternative conditional | IF *condition* THEN  *statement*  *statement*  ELSE  *statement*  *statement*  END IF | IF num\_dogs > 10 THEN  DISPLAY “You have more than 10 dogs!”  ELSE  DISPLAY “You have ten or fewer dogs!”  END IF |
| Use a switch/case statement | SELECT *variable or expression*  CASE *value\_1:*  *statement*  *statement*  CASE *value\_2:*  *statement*  *statement*  CASE *value\_2:*  *Statement*  *statement*  DEFAULT:  *statement*  *statement*  END SELECT | SELECT num\_dogs  CASE 0: DISPLAY “No dogs!”  CASE 1: DISPLAY “One dog..”  CASE 2: DISPLAY “Two dogs..”  CASE 3: DISPLAY “Three dogs..”  DEFAULT: DISPLAY “Lots of dogs!”  END SELECT |
| **Loops** | | |
| Loop while a condition is true - the loop body will execute 0 or more times. | WHILE *condition*  *statement*  *statement*  END WHILE | SET num\_dogs = 1  WHILE num\_dogs < 10  DISPLAY num\_dogs, “ dogs!”  SET num\_dogs = num\_dogs + 1  END WHILE |
| Loop while a condition is true - the loop body will execute 1 or more times. | DO  *statement*  *statement*  WHILE *condition* | SET num\_dogs = 1  DO  DISPLAY num\_dogs, “ dogs!”  SET num\_dogs = num\_dogs + 1  WHILE num\_dogs < 10 |
| Loop a specific number of times. | FOR *counter = star*t TO *end*  *statement*  *statement*  END FOR | FOR count = 1 TO 10  DISPLAY num\_dogs, “ dogs!”  END FOR |
| **Functions** | | |
| Create a function | FUNCTION *return\_type name (parameters)*  *statement*  *statement*  END FUNCTION | FUNCTION Integer add(Integer num1, Integer num2)  DECLARE Integer sum  SET sum = num1 + num2  RETURN sum  END FUNCTION |
| Call a function | CALL *function\_name* | CALL add(2, 3) |
| Return data from a function | RETURN *value* | RETURN 2 + 3 |