**COMSATS University Islamabad, Lahore Campus**

**Terminal Examination–Spring 2021**

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| Course Title: | Programming Fundamentals | | | | | | | Course Code: | | | CSC103 | | Credit Hours: | 4(3,1) |
| Course Instructor/s: | Dr. M. Aksam Iftikhar, Dr. Adeel | | | | Program Name: | | | | BS Computer Science | | | | | |
| Semester: | 2nd | Batch: | FA20-BCS | Section: | A/B | | | | Date | | | 21-06-2021 | | |
| **Time Allowed:** | **3 Hour** | | | | | **Maximum Marks:** | | | | | | **50** | | |
| Student’s Name: |  | | | | | | Reg. No. | | |  | | | | |
| **Important Instructions / Guidelines:**   * *Copy the solution code and the solution output to a SINGLE word doc file to upload. (NO PDF, NO ZIP FILE).* * Assume only ‘C++’ programming language for attempting the solution of this paper. * Your program should be properly indented and be properly commented. | | | | | | | | | | | | | | |

Q.1 Write a program which should print your name and registration number on the screen then do the following:

COMSATS has launched an online shopping ordering system which sells 5 different products. A list of product number, product name and their retail price is given below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Product Number** | **Product Name** | **Retail Price in Rs.** | **Quantity Available** |
| 101 | Soap | 60.00 | 10 |
| 102 | Liquid Hand Wash | 200.00 | 20 |
| 103 | Liquid Dish Wash | 150.00 | 30 |
| 104 | Table cleaner | 350.00 | 40 |
| 105 | Hand Sanitizer | 100.00 | 50 |

1. You must declare the struct product\_type for storing the above information related to a product. Then, your program must create an array of product\_type and store the above information in this array. Your program should display the products information (using a loop) in tabular format (as shown in the sample output at the end).
2. Your program should ask the user to enter the number of products they want to purchase (you must validate this number). Then, for each product, ask the user to enter the product number and the quantity to be purchased (see sample output).
   1. Your program must validate the product number entered by the user whether that product number exists in the product\_type array or not. If the product number does not exist in the array, then it should ask the user to enter the correct product number (see sample output).
   2. It should also validate the product quantity to see if there are enough products to complete the order. If there is insufficient quantity, it should inform the user and fill the order with as many product quantities as possible (see sample output).
3. Your program should display product number, product name, retail price, quantity purchased, calculate and display the Amount (retail price x quantity purchase) of each product sold and calculate the total bill for all the products sold. It should NOT display zero quantity products or zero total amount (as shown below).
4. [optional] The program should keep asking the user if he wants to order any other products until the user indicates that he does not want to order more products and wants to quit the program (as shown below).

**Note:** Creating a struct for product is MUST in this program. For bonus points (not beyond the total marks), attempt part D and divide your code into multiple functions, e.g. for reading products data, for searching a product in the array, for displaying products data in table etc.

**Sample OUTPUT:**

