In order to let you enjoy your Eid pressure free, I did not upload any assignments then. But now the time has arrived for you to show your programming skills once again and collect some valuable marks for your grade.

Instructions regarding assignment:

i) You will submit your code pasted here in this document under the question for which you made the code. Then upload this document as your assignment submission.

ii) You will need to answer question no. **(i)** determined by your student ID (it will carry 10 marks). You may then attempt the bonus question (it will carry another 10 marks).

iii) **The deadline for upload will be 11:59am, 5th September, 2018, Wednesday**. Incase if the portal is down when you are about to upload, email the solution to me, but emails sent after the deadline will not qualify as valid submissions.

iv) Instructions for which student will solve which question is given with the questions. It will be determined by your ID.

Student ID Format: FS-MMMMM-L (i.e. 12-34567-1)

1. If the Middle part of your ID is EVEN (MMMMM%2==0) & the addition of the first, second and last digit is ODD ((F+S+L)%2!=0):

i) Create a RestaurantMeal class that holds the name and price of a food item served by a restaurant. Its constructor requires arguments for each field. Create a HotelService class that holds the name of the service, the service fee, and the room number to which the service was supplied. Its constructor also requires arguments for each field. Create a RoomServiceMeal class that inherits from both RestaurantMeal and HotelService. Whenever you create a RoomServiceMeal object, the constructor assigns the string "room service" to the name of the service field, and $4.00 is assigned to the service fee inherited from HotelService. Include a RoomServiceMeal function that displays all of the fields in a RoomServiceMeal by calling display functions from the two parent classes. Additionally, the display function should display the total of the meals plus the room service fee. In a main()function, instantiate a RoomServiceMeal object that inherits from both classes. For example, a "steak dinner" costing $19.99 is a "room service" provided to room 1202 for a $4.00 fee. Save the file as **RoomService.cpp**..

2. If the Middle part of your ID is EVEN (MMMMM%2==0) & the addition of the first, second and last digit is EVEN ((F+S+L)%2==0):

i) Create an Investment class that contains fields to hold the initial value of an investment, the current value, the profit (calculated as the difference between current value and initial value), and the percent profit (the profit divided by the initial value). Include a constructor that requires initial and current values and a display function. Create a House class that includes fields for street address and square feet, a constructor that requires values for both fields, and a display function. Create a HouseThatIsAnInvestment class that inherits from Investment and House. It includes a constructor and a display function that calls the display functions of the parents. Write a main()function that declares a HouseThatIsAnInvestment and displays its values. Save the file as **HouseThatIsAnInvestment.cpp**.

3. If the Middle part of your ID is ODD (MMMMM%2!=0) & the addition of the first, second and last digit is EVEN ((F+S+L)%2==0):

i) Create a base class named Book. Data fields include title and author; functions include those that can set and display the fields. Derive two classes from the Book class: Fiction, which also contains a numeric grade reading level, and NonFiction, which contains a variable to hold the number of pages. The functions that set and display data field values for the subclasses should call the appropriate parent class functions to set and display the common fields, and include specific code pertaining to the new subclass fields. Write a main()func- tion that demonstrates the use of the classes and their functions. Save the file as **Books.cpp**.

4. If the Middle part of your ID is ODD (MMMMM%2!=0) & the addition of the first, second and last digit is ODD ((F+S+L)%2!=0):

i) Create a class named MusicalComposition that contains fields for title, composer, and year written. Include a constructor that requires all three values and an appropriate display function. The child class NationalAnthem contains an additional field that holds

thenameoftheanthem'snation.Thechildclassconstructorrequiresavalueforthis additionalfield.Thechildclassalsocontainsa displayfunction.Writeamain()function that instantiates objects of each class and demonstrates that the functions work correctly. Savethefileas **Compositions.cpp**.

BONUS QUESTION:

1. Write an entire C++ program that reads a positive integer entered by an interactive user and then prints out all the positive divisors of that integer in a column and in decreasing order. The program should allow the user to repeat this process as many times as the user likes. Initially, the program should inform the user about how the program will behave. Then the program should prompt the user for each integer that the user wishes to enter.

The program may be terminated in any of two ways. One way is to have the program halt if the user enters an integer that's negative or zero. In this case the user should be reminded with each prompt that the program can be terminated in that way. Alternatively, after an integer has been entered and the divisors have been printed, the program can ask the user whether he/she wishes to enter another integer. In this case, when the user accidentally enters a zero or negative integer to have its divisors calculated, the program should inform the user that the input is unacceptable and should allow the user to try again (and again!).

Here is an illustration of how the program and the interactive user might interact. The user's responses to the program are shown in bold italics.

This program is designed to exhibit the positive divisors of positive integers supplied by you. The program will repeatedly prompt you to enter a positive integer. Each time you enter a positive integer, the program will print all the divisors of your integer in a column and in decreasing order.

Please enter a positive integer: ***36***
36
18
12
9
6
4
3
2
1

Would you like to see the divisors of another integer (Y/N)? ***y***
Please enter a positive integer: ***-44***

-44 is not a positive integer. Please enter a positive integer: ***0***

0 is not a positive integer.
Please enter a positive integer: ***109***
109
1

Would you like to see the divisors of another integer (Y/N)? ***m***

Please respond with Y (or y) for YES and N (or n) for NO.
Would you like to see the divisors of another integer (Y/N)? ***n***