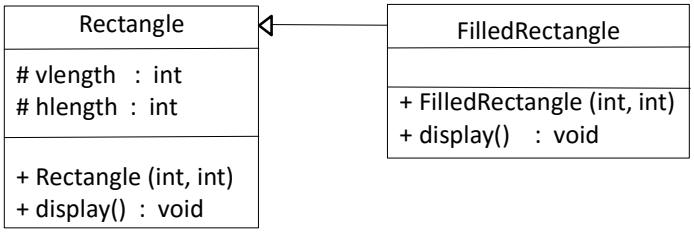
**EHB354E - MIDTERM EXAM - 25/4/2023**

- Use the Microsoft Word file (Answers File) that is provided on Ninova, to write your answers.
- When you finish answerings, save the Word file on your computer and exit from Word program.
- Submit the Word file to Ninova from Homeworks section.

**QUESTION 1)** [40 points] Write the C++ program to do followings.

**a)** [25 points] Write C++ class codes for UML class and inheritance diagrams below. ( + is public, # is protected)

- Length variables (vertical and horizontal) are number of characters, not pixels.
- Base class constructor function checks length parameters for valid ranges : 0 < vlength <= 40 and 0 < hlength <= 80
  If any of them is invalid, function prints message "INVALID LENGTHS", and assigns 1 to both data members.
- The display function prints the object on screen by using "*" characters.




**b)** [15 points] Write the main program to define the objects whose constructor parameter values (lengths) are given below.
Rectangles : (10, 10) , (5, 20) , (0, 0) , (1, 10)
FilledRectangles : (15, 8) , (6, 13) , (-1, -1)
Call the display functions of all objects, so that they are printed on screen.

```
RECTANGLE  (Vertical=5 , Horizontal=20)
********************
*                  *
*                  *
*                  *
********************

FILLED RECTANGLE  (Vertical=6 , Horizontal=13)
*************
*************
*************
*************
*************
*************
```

**QUESTION 2)** [35 points]

**a)** [15 points] Write C++ codes for member functions of the Collection class given below.

- Default constructor initializes the liste array with empty strings.
- Overloaded + operator adds a new item at the first empty location in liste array.
- Overloaded == operator compares member liste of itself with the member liste of the other object.
  If order of liste items and their string contents are exactly same, then function returns true, else returns false.

```
class Collection {
private: string liste[10];                    //Array of strings (items)
public:
  Collection();                               //Default constructor
  void  operator+  (string  newitem);         //Member
  bool  operator== (Collection  other);       //Member
  friend  void  operator<<  (ostream&  cihaz,  Collection  col);  //Nonmember
};
```

**b)** [10 points] Write C++ codes for nonmember overloaded << operator function (friend).
Function takes a Collection object as argument, and displays the liste array on device (cihaz) argument.

**c)** [10 points] Write the main program to do followings, **by using the overloaded operators**.

- Define two Collection objects named C1 and C2.
- Add "Apple" , "Orange" , "Cherry" to C1. Add "Apple" , "Kiwi" to C2.
- Display C1 and C2 on screen.
- Compare C1 with C2, then display a message about result of comparison.

```
Items in C1 collection : Apple  Orange  Cherry
Items in C2 collection : Apple  Kiwi
Two collections are not equal
```

**QUESTION 3)** [25 points] Write the C++ program whose prototype is : **int main (int argc, char * argv [ ] )**
Program takes command-line arguments in argv array, which contains the list of several text file names with their extensions.
Example execution from command-line : " c:\ program.exe dosya1.txt dosya2.txt dosya3.txt dosya4.txt "
Program opens and reads all text file contents row-by-row, and writes (appends) them to a new text file named "output.txt".
The output file will contain appended contents of all text files, whose names are given in argv argument.
Program should implement **try-catch** blocks, and the following **throw** messages.
"Error : At least two filenames required"
"Error : Output file could not be opened"
"Error : Input file ?.txt could not be opened"