Data Structure Lab Work 2020 - Practice 1

1. Create new Code::Block Console C++ Project
2. Create a new header (*.h) file, name the file: locker.h
3. Create a new cpp implementation (*.cpp) file, name the file: locker.cpp
4. In locker.h file, create an Abstract Data Type in form of array to store integer as follow

```
Type Locker <  data    : integer[100],
               max     : integer,
               num     : integer >
```

   Nb:
   - Max is the maximum length of the array
   - Num shows how many data stored inside the array data. It also indicates where (at what index) the last data is inside the array. num=-1 means that the array is empty

5. In locker.h file, add the following function names

```
void add_data( locker &l, int x );
void view_data( locker l );
int search_data( locker l, int x );
```

6. In locker.cpp file, define the add_data() procedure which receive an integer x, and insert it into the locker data at index 0, 1, …, and so on until it maxed out. The procedure does not change the locker if it is already full. See example below:

```
locker storage;
storage.max = 8;
storage.num = -1;
```

```
Storage:                    max:      num:
        [ ][ ][ ][ ][ ][ ][ ][ ]      [8]       [-1]
```

```
Add_data( storage, 6 )

Storage:                    max:      num:
        [6][ ][ ][ ][ ][ ][ ][ ]      [8]       [0]
```

```
Add_data( storage, 4 )

Storage:                    max:      num:
        | 4 | 6 |   |   |   |   |   |   |      | 8 |      | 1 |
```

```
Add_data( storage, 8 )

Storage:                    max:      num:
        | 8 | 4 | 6 |   |   |   |   |   |      | 8 |      | 2 |
```

```
Add_data( storage, 2 )

Storage:                    max:      num:
        | 2 | 8 | 4 | 6 |   |   |   |   |      | 8 |      | 3 |
```

7. In locker.cpp file, define the view_data() procedure to print all value inside the locker data

8. In locker.cpp file, define the search_data() function to find the first-found value x inside storage data. The function will return the index location inside locker data. If the value x is not found, function will return -1. See example below:

```
Storage:                    max:      num:
        | 2 | 8 | 4 | 6 |   |   |   |   |      | 8 |      | 3 |
```

```
i = search_data( storage, 8 )

Storage:                    max:      num:      i:
        | 2 | 8 | 4 | 6 |   |   |   |   |      | 8 |      | 3 |      | 1 |
```

```
i = search_data( storage, 5 )

Storage:                    max:      num:      i:
        | 2 | 8 | 4 | 6 |   |   |   |   |      | 8 |      | 3 |      | -1 |
```

9. In main.cpp file, add the following lines

```
locker storage;
storage.max = 8;
storage.num = -1;
add_data( storage, 6 );
view_data( storage );
add_data( storage, 4 );
view_data( storage );
add_data( storage, 8 );
view_data( storage );
add_data( storage, 2 );
view_data( storage );

int i;
i = search_data( storage, 8 );
cout<<i<<endl;

i = search_data( storage, 5 );
cout<<i<<endl;
```

Congratulation! You've finished the first module