

Notice: Return your C++ source codes into **Oma** before deadline. Only so you can get credits from this homework. You can't return these source codes after deadline.

1. **Vector**. Implement a program **1.cpp** where you read a string. Your program checks if the string or sentence is palindrome (<https://en.wikipedia.org/wiki/Palindrome>). Notice that for instance finish sentence "innostunut sonni" is palindrome because spaces will be ignored. You have to use **vectors**, **push_back** and **pop_back** on your solution (figure 1). Program must print the original and reverse string. Of course you have to print also the text "String is not palindrome" or "String is palindrome".

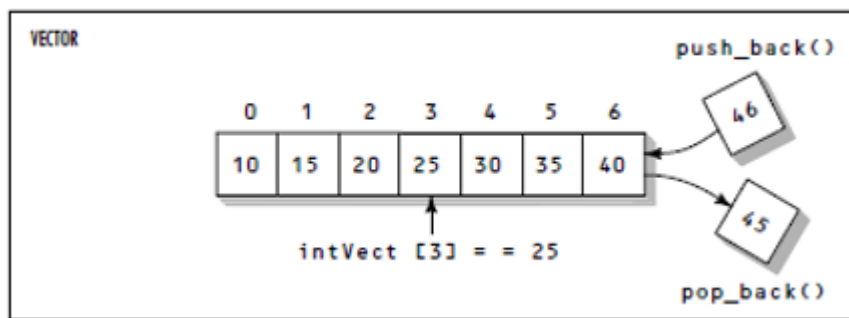


Figure 1. vector operations

2. **Vector, Count and Sort**. Implement program **2.cpp** which reads course scores of students (integers 0, 1, 2, 3, 4 and 5) from file "scores.txt" and counts the number of different grades. After that program prints the horizontal bars of each grade. You have to use **Vector**, **Count** and **Sort**.

```
0: ***
1: *****
2: *****
3: *****
4: *****
5: ***|
```

Figure 2. Sample print in Dev C++ -program

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3. **Vector, Count** and **Sort**. Implement program **3.cpp** which reads course points of students (integers 0, 1, ..., 58, 59, 60) from file "points.txt" and change points to grades. Maximum points is 60. After that you have to change points to grades so that limits are 30, 35, 40, 45 and 50. After that program prints the horizontal bars of each grade (figure 3). You have to use **Vector, Count** and **Sort**.

```
0: ***  
1: *****  
2: *****  
3: *****  
4: *****  
5: ***|
```

Figure 3. Sample print in Dev C++ -program

4. **List**. An STL list container is a doubly linked list (figure 4), in which each element contains a pointer not only to the next element but also to the preceding one. Implement program **4.cpp** which gets characters (letters) from keyboard one character (letter) at time. Space is ending. In program character is inserting into the list so that characters are in alphabetical order. Finally program prints letter in ascending and descending order. There must be space between letters.

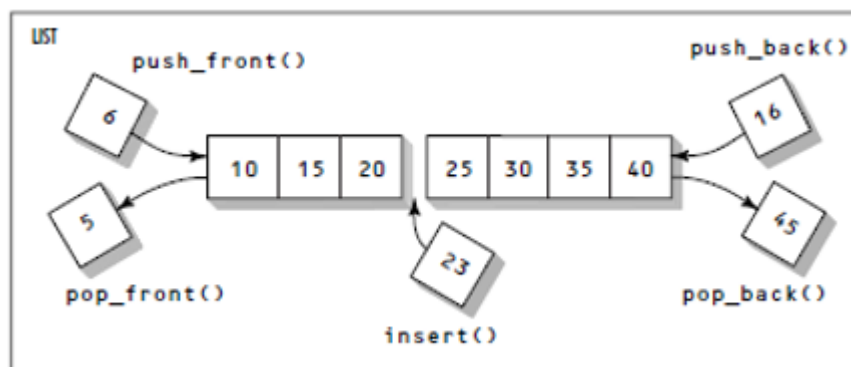


Figure 4. List operations

5. **List** and **sort**. Implement a program **5.cpp** which creates a list of 10 random integers (use a list) and then puts the list into sorted order. This program must print integers before and after sorting. Sample print is in figure 5.

```
Original list:
41 18467 6334 26500 19169 15724 11478 29358 26962 24464

Sorted contents:
41 6334 11478 15724 18467 19169 24464 26500 26962 29358
```

Figure 5. Sample print in Dev C++ -program

6. **Vector**. Implement a program **6.cpp** which contains menu (figure 6). You can add and remove book to vector. Elements of vector are structures which contains name of book and author of book. You can also remove books of vector and print the number of books in vector. Sample print is in figure 6. You can get 2 points of this task.

```
***** Welcome to database *****
a. Add a book.
b. Remove a book.
c. Empty database.
d. Show the number of books currently in database.
e. Quit.

Please enter a choice: a
Please enter the name of the book: Hohto
Please enter the name of the author: Stephen King
The book has been added.

a. Add a book.
b. Remove a book.
c. Empty database.
d. Show the number of books currently in database.
e. Quit.

Please enter a choice: d
The number of books in current database is 1.

a. Add a book.
b. Remove a book.
c. Empty database.
d. Show the number of books currently in database.
e. Quit.

Please enter a choice: e
Bye.
```

Figure 6. Sample print in Dev C++ -program