Assignment 4 (due 11 pm, Apr. 14, 2016)

Note:

a. Please write down handwriting part in HW4_ID.doc.
b. Create a directory HW4_ID to put HW4_ID, HW4_1_ID.cpp, HW4_2_ID.cpp
c. Zip the directory with name HW4_ID.zip for final submission
d. Incorrect formation files will not be graded.
e. You can check HW4_1_ID.cpp and HW4_2_ID.cpp in the test server before submission. The instruction of test server will be released later.
f. If you work with others for this assignment, please put their name in the HW4_ID.doc

Q1. Give a doubly linked list with length n, which save odd number from 1 to 2n-1

Ex: n = 3, list : 1 ⇔ 3 ⇔ 5

Now, write a program to add an even number m into this list. Also, put m at the appropriate position of the list in order to keep the sequence of the list.

Ex: m = 4, list after add 4 : 1 ⇔ 3 ⇔ 4 <=>5

Q2. Give an implementation of Q1 in C++, and give the filename : HW4_1_ID.cpp

Input (cin) : n, m, with 0 < m < n <= 24

Ex: 3, 4

Output (cout) : print out the list before and after adding m

Ex: 1 3 5

1 3 4 5

Q3. Give a recursive algorithm to output all permutations of 1,..., n in lexicographical order.

Q4. Give an implementation of Q3 in C++, and give the filename : HW4_2_ID.cpp

Input : n with 0 < n <= 10

Ex :

3

Output : all possible output

Ex : 1,2,3

1,3,2

2,1,3

2,3,1

3,2,1

3,1,2

Q5. How to delete the first node of a singly list ? Assume a list L with length m.

Q6. Given an implementation of a singly linked list support prepend, append, insert, and delete operations in C++ (This is handwriting homework. All of them are short enough)

Note : prepend : Insert a node before the first node

Append : Insert a node after the last node

Insert : Insert a node before m-th node where m > 1

Delete : Delete the m-th node

Q7. Reading assignment: Section 4.3

What is iterator, template in class ? What are advantages using them ? You can use examples to explain

Q8. How to insert a node before the first node of a circular list

Q9 Implement Q8 in C++ (This is handwriting homework.)

Q10. What are differences between arrays and pointers in C ?