



CS350 - Algorithms and Complexity



Class: APCS 2013

Date: May 10 - May 22, 2016

Personal Report

Student ID: 1351026

Student's full name: Hoàng Khôi

Email: hkhoi@apcs.vn

Tel:

^x
x^o **Directions:**

- Each student is expected to practise with 10 problems from codeforces.com (or similar programming contest sites).
- Each student can freely choose 10 problems to practice.
- For each problem, each student can submit multiple solutions. The student is required to present in details only one best solution for each problem.

1 Submission Overview

Directions:

Please present the overview of your submissions for 10 problems.

- **URL of Problem (Column A):** URL (in codeforces.com) of the problem you solve
- **Note (Column B):** Please check [x] on the most appropriate option (please be honest ☐).
 - o **I solve the problem by myself without any reference:** You choose this option when you manually solve the problem by yourself and do not read the tutorial, hint, or existing solutions.
 - o **I solve the problem by myself after reading some reference:** You choose this option when you manually write the program to solve the problem by yourself after you read the tutorial, hint, or existing solutions.
 - o **I reuse an existing solution but I understand it :** You choose this option when you just copy an existing solution. It is essential that you **MUST** read and understand the source code that you submit.
- **Result (Column C):** Please check [x] on the appropriate result of your final submission for the problem. If your final submission is still not accepted, please give the reason for this failure.

No	URL of Problem (A)	Note (B)	Result (C)
1	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=1130	<input type="checkbox"/> I solve the problem by myself without any reference <input type="checkbox"/> I solve the problem by myself after reading some reference <input type="checkbox"/> I reuse an existing solution but I understand it.	<input type="checkbox"/> Accepted <input type="checkbox"/> Not accepted Reason:
2	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=1886&mosmsg=Submission+received+with+ID+17398910	<input type="checkbox"/> I solve the problem by myself without any reference <input type="checkbox"/> I solve the problem by myself after reading some reference <input type="checkbox"/> I reuse an existing solution but I understand it.	<input type="checkbox"/> Accepted <input type="checkbox"/> Not accepted Reason:
3	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2261&mosmsg=Submission+received+with+ID+17398910	<input type="checkbox"/> I solve the problem by myself without any reference <input type="checkbox"/> I solve the problem by myself after reading some reference <input type="checkbox"/> I reuse an existing solution but I	<input type="checkbox"/> Accepted <input type="checkbox"/> Not accepted Reason:

No	URL of Problem (A)	Note (B)	Result (C)
	399143	understand it.	
4	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2949&mosmsg=Submission+received+with+ID+17399203	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference [] I reuse an existing solution but I understand it.	[x] Accepted [] Not accepted Reason:
5	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=3139	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference [] I reuse an existing solution but I understand it.	[x] Accepted [] Not accepted Reason:
6	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=728	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference [] I reuse an existing solution but I understand it.	[x] Accepted [] Not accepted Reason:
7	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1625	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference [] I reuse an existing solution but I understand it.	[x] Accepted [] Not accepted Reason:
8	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=293&mosmsg=Submission+received+with+ID+17401121	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference [] I reuse an existing solution but I understand it.	[x] Accepted [] Not accepted Reason:
9	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1055	[x] I solve the problem by myself without any reference [] I solve the problem by myself after reading some reference	[x] Accepted [] Not accepted Reason:

No	URL of Problem (A)	Note (B)	Result (C)
		<input type="checkbox"/> I reuse an existing solution but I understand it.	
10	https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=2502	<input checked="" type="checkbox"/> I solve the problem by myself without any reference <input type="checkbox"/> I solve the problem by myself after reading some reference <input type="checkbox"/> I reuse an existing solution but I understand it.	<input checked="" type="checkbox"/> Accepted <input type="checkbox"/> Not accepted Reason:

2 Problem 01

Please note: There is no submission link for UVa Online Judge, so I have to push the solution to GitHub.

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=1130)

option=com_onlinejudge&Itemid=8&page=show_problem&problem=1130

Please fill in the URL of your submission in Codeforces.com

URL of submission: [https://github.com/hkhoi-](https://github.com/hkhoi-coder/CS350/blob/master/UVa10189.java)

coder/CS350/blob/master/UVa10189.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- Result:

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Easy simulation problem, the only bugs that could arise is array bound error

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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[illegible]

3 Problem 02

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=1886&mosmsg=Submission+received+with+ID+17398910)

option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=1886&mosmsg=Submission+received+with+ID+17398910

Please fill in the URL of your submission in Codeforces.com

URL of submission: <https://github.com/hkhocoder/CS350/blob/master/UVa10945.java>

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

The idea is simple, we append all alphabetic characters into a StringBuilder and then make it into lower-case string, then check if it is palindrome or not (using two 'pointers' at two ends, run towards each other)

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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[illegible]

4 Problem 03

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2261&mosmsg=Submission+received+with+ID+17399143)

option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2261&mosmsg=Submission+received+with+ID+17399143

Please fill in the URL of your submission in Codeforces.com

URL of submission: [https://github.com/hkhoi-](https://github.com/hkhoi-coder/CS350/blob/master/UVa11286.java)

coder/CS350/blob/master/UVa11286.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Nothing much, the key is to use Map and Set elegantly!

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

5 Problem 04

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2949&mosmsg=Submission+received+with+ID+17399203)

option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=2949&mosmsg=Submission+received+with+ID+17399203

Please fill in the URL of your submission in Codeforces.com

URL of submission: <https://github.com/hkhocoder/CS350/blob/master/UVa11849.java>

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☐ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Use java.util.HashSet to check for duplications

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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[illegible]

6 Problem 05

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=3139)

option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=3139

Please fill in the URL of your submission in Codeforces.com

URL of submission: [https://github.com/hkhoid-](https://github.com/hkhoidcoder/CS350/blob/master/UVa11988.java)

coder/CS350/blob/master/UVa11988.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Key idea is to use doubly linked list of string or java.util.StringBuilder

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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7 Problem 06

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=728)

option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=728

Please fill in the URL of your submission in Codeforces.com

URL of submission: <https://github.com/hkhai-coder/CS350/blob/master/UVa00787.java>

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- Result:

Please fill in the appropriate option on the result of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Let's call $F[x][y]$ = Product from Array[x] to Array[y]

$F[x][y] = \text{Array}[x]$ when $x == y$

$F[x][y] = F[x][y - 1] * \text{Array}[y]$

For each $F[x][y]$ calculated, let $\text{max} = \text{MAX}(F[x][y], \text{max})$

Result to be returned is max

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

[illegible]

8 Problem 07

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1625)

option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1625

Please fill in the URL of your submission in Codeforces.com

URL of submission: <https://github.com/hkhai-coder/CS350/blob/master/UVa10684.java>

Please check into the most appropriate option for this submission:

☐ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

This is the problem of finding maximum sum of consecutive elements in an array. To solve, use improved Kadane's algorithm

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

9 Problem 08

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=293&mosmsg=Submission+received+with+ID+17401121)

option=com_onlinejudge&Itemid=8&page=show_problem&category=24&problem=293&mosmsg=Submission+received+with+ID+17401121

Please fill in the URL of your submission in Codeforces.com

URL of submission: <https://github.com/hkhocoder/CS350/blob/master/UVa00357.java>

coder/CS350/blob/master/UVa00357.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☐ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

This is exactly a class Dynamic Programming problem (coin exchange).

Given n cents, create an array table[n + 1].

For each type of currency (penny, dime, quarter...) we apply this formula:

table[i] = table[i - currency] : i > currency

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

10 Problem 09

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1055)

option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=1055

Please fill in the URL of your submission in Codeforces.com

URL of submission: [https://github.com/hkhoc-](https://github.com/hkhoc/coder/CS350/blob/master/UVa10114.java)
coder/CS350/blob/master/UVa10114.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

This is a pure and quite complicated simulation problem, follow the process and implement it with care

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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11 Problem 10

Please fill in the URL of the problem in Codeforces.com

URL of problem: [https://uva.onlinejudge.org/index.php?](https://uva.onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=2502)

option=com_onlinejudge&Itemid=8&category=24&page=show_problem&problem=2502

Please fill in the URL of your submission in Codeforces.com

URL of submission: [https://github.com/hkhai-](https://github.com/hkhai-coder/CS350/blob/master/UVa11507.java)

coder/CS350/blob/master/UVa11507.java

Please check into the most appropriate option for this submission:

☒ **I solve the problem by myself without any reference**

☐ **I solve the problem by myself after reading some reference**

Please list all reference links (tutorial, hint, existing solutions, etc):

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☐ **I reuse an existing solution but I understand it.**

The URL of existing solution:

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- **Result:**

Please fill in the appropriate option on the result of of your submission in Codeforces.com

☒ Accepted ☐ Not accepted

Number of accepted tests:..... /Total number of tests:

Present the key idea to solve this problem:

Simulation process, to solve this, we need carefulness, imagination and implementation skills, that's all!

If there are tests that your solution cannot solve successfully, please present one test. Do you have any idea on the reason why your solution cannot solve it?

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[illegible]