Recruitment in Taiwan 2016 Programming Examination

Write program(s) for examination 1 or 2 attached, in accordance with the following rules;

Rules

1 - Write program for **one examination at least**.
You can write programs for BOTH of two examinations, or you can write program for examination 1 or 2.

2 – Use either **Java or C++**.

3 – Use attached code skeleton.
*__Do not change__ package names written in the attached document.
*Any classes or functions in the skeleton **MUST NOT BE** changed.
(name, variable number, parameters and return value)
*You can add new classes and/or functions if you need.

4 – **English** only.
Use English or derivatives of English for all class names, identifiers, method names, comments, etc…

5 – **Do not copy** the source code from the other students or from Web sites.*

6 – Do not show your source code to other students or on any Web site.*

* If we find the same source code with the others', we will not accept it.

7 – Submission is allowed **only once**.
Test your program(s) by yourself carefully in various cases before submission.

8 -Use UTF-8 file encoding.

9 -Don't use restricted functions such as system.

Environment

<Java>
Compile and execute in Java7 environment.
You can use the classes of Java Platform Standard Edition 6/7 API Specification but CAN NOT use other libraries.

<C++>
Compiler : GCC 4.8.2 or later(The latest version of g++ by apt-get).
You CAN use only C++ Standard Library. Do not use other libraries.

Dead line : In 3 days

Note

***Faster code is better**
Implementation with faster execution will lead to higher scores.

***Comment out the code for comments output and debug when you submit source code.**

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Online site for pre-verification

You can use our online site for pre-verification before you submit the source code formally.
On this site, you can verify your source code by the following things;

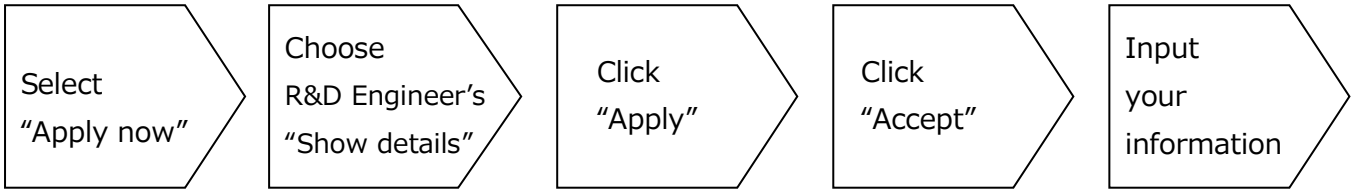
- compile
- the most simple test case.

URL: http://examchk.worksap.com/ user id: student / password: G0Ywxch3

How to submit

Submit your program(s) according to the following procedure.

1, Go to http://career.worksap.com/ and select “Apply now” button.



2, Input your information as directed, then you will find the upload page of the Programming Examination.

*When you upload your program, please select which Exam you are going to submit and which language you have used.

(e.g.1) In case of choosing Examination1 in C++

Exam1_Java	×
Exam1_C++	○
Exam2_Java	×
Exam2_C++	×

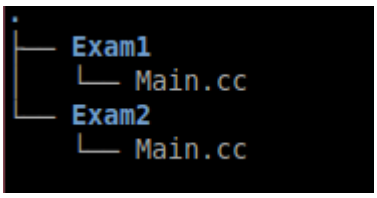
(e.g.2) In case of choosing Examination2 in Java

Exam1_Java	×
Exam1_C++	×
Exam2_Java	○
Exam1_C++	×

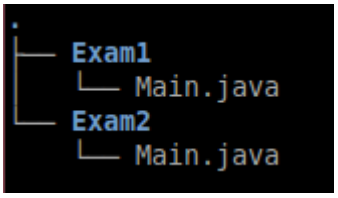
(e.g.3) In case of writing both examinations, examination1 in C++ examination2 in Java

Exam1_Java	×
Exam1_C++	○
Exam2_Java	○
Exam1_C++	×

3, You are supposed to submit a zip file, with folder structure described as below.



OR



You can choose either C++ or Java to solve each problem.

Next Step : Regarding the interview

If you pass the programming examination, we will interview you including live coding in front of our engineer with your source code for the examination.

We are looking forward to your Submission.

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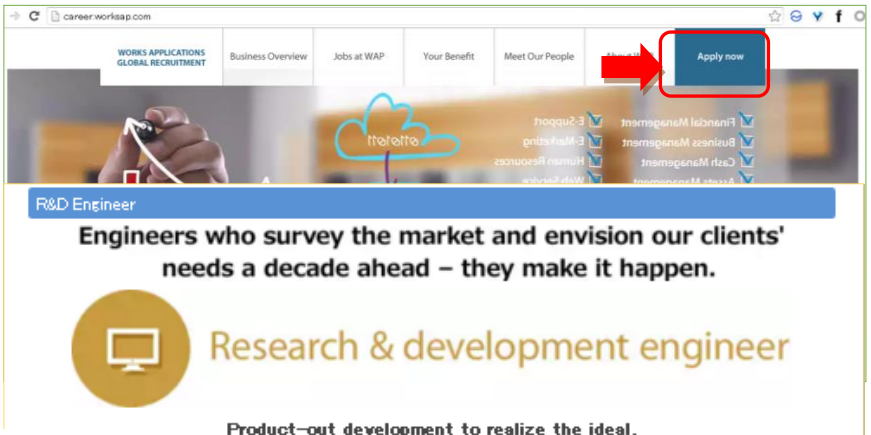
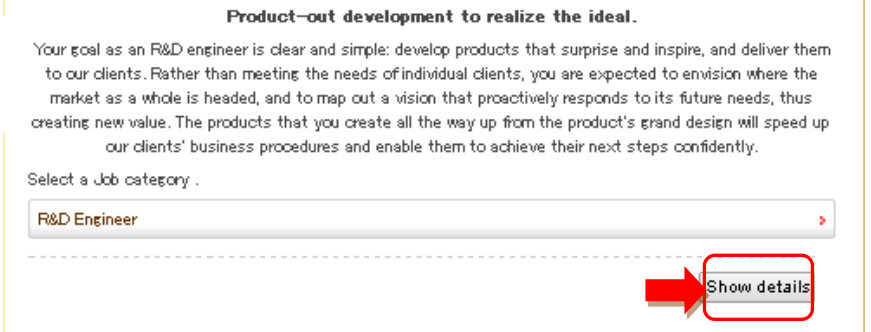
※Submission Process

1. **Go to** http://career.worksap.com/

   Click Apply now

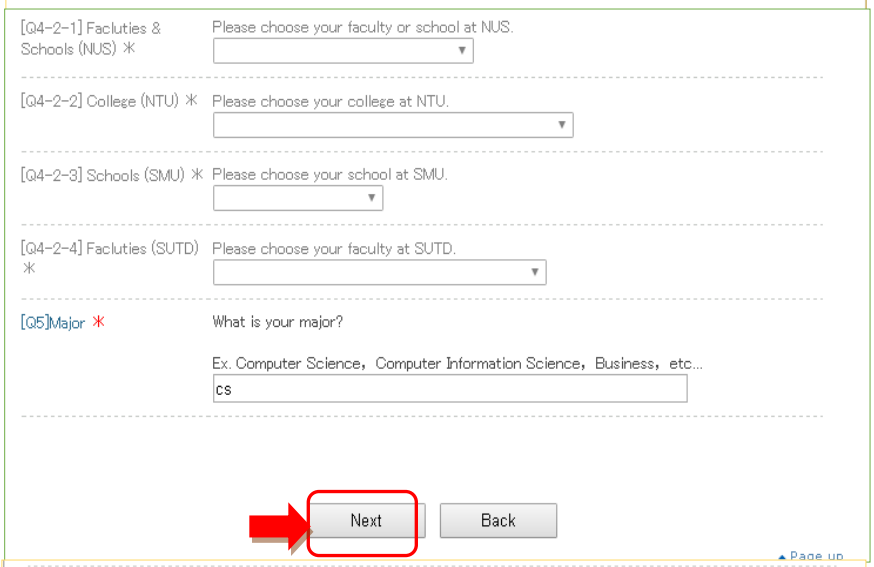


2. **Click Show details**

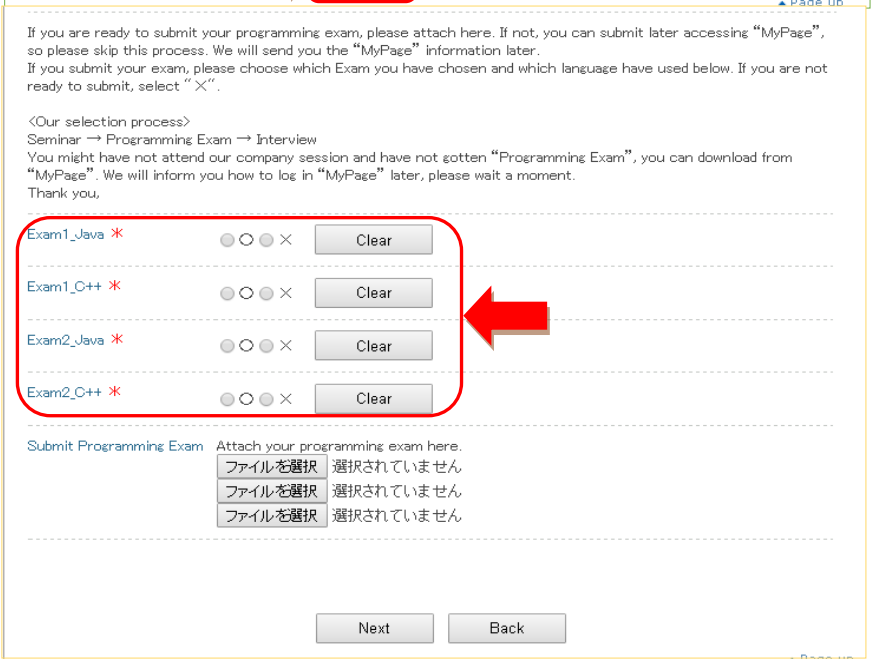


3. **Input your personal information.**

   And then click Next



4. **Before upload your programming exam, check which exam you have done and what language you used**



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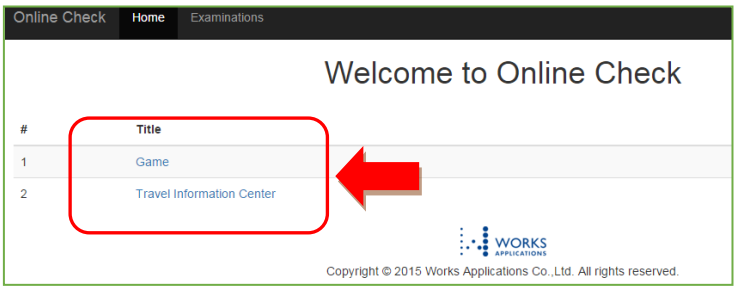
※ Program test method

1. **Go to http://examchk.worksap.com/**
   ID: student **Pw:** G0Ywxch3
2. **Choose the exam you have done.**



3. **Paste your source code, and then click**

Verify Solution → **Verifiation Result: Accepted**

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[Exam1] Game

Jeff loves playing games, Gluttonous snake(an old game in NOKIA era) is one of his favourites. However, after playing gluttonous snake so many times, he finally got bored with the original rules.

In order to bring new challenge to this old game, Jeff introduced new rules :

1. The ground is a grid, with n rows and m columns(1 <= n, m <= 500).
2. Each cell contains a value v (-1 $\leq$ vi $\leq$ 99999), if v is -1, then this cell is blocked, and the snake can not go through, otherwise, after the snake visited this cell, you can get v point.
3. The snake can start from any cell along the left border of this ground and travel until it finally stops at one cell in the right border.
4. During this trip, the snake can only go up/down/right, and can visit each cell only once.

Special cases :

a. Even in the left border and right border, the snake can go up and down.
b. When the snake is at the top cell of one column, it can still go up, which demands the player to pay all current points , then the snake will be teleported to the bottom cell of this column and vice versa.

After creating such a new game, Jeff is confused how to get the highest score. Please help him to write a program to solve this problem.

Input

The first line contains two integers n (rows) and m (columns), (1 <= n, m <= 500), separated by a single space.
Next n lines describe the grid. Each line contains m integers vi (-1 $\leq$ vi $\leq$ 99999)
vi = -1 means the cell is blocked.

Output

Output the highest score you can get. If the snake can not reach the right side, output -1.

Limits

- Memory limit per test : 256 megabytes
- Time limit per test : The faster the better

Compile & Environment

C++

```
g++ Main.cc -o Main -fno-asm -Wall -lm --static -std=c++0x -DONLINE_JUDGE
```

Java

Java 7
Maximum stack size is 50m

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Skeleton Code

Java

```
public class Main {
	public static void main(String[] args) {
		// TODO: Implement your program
	}
}
```

C++

```
int main(){
	// TODO: Implement your program
}
```

Sample Test

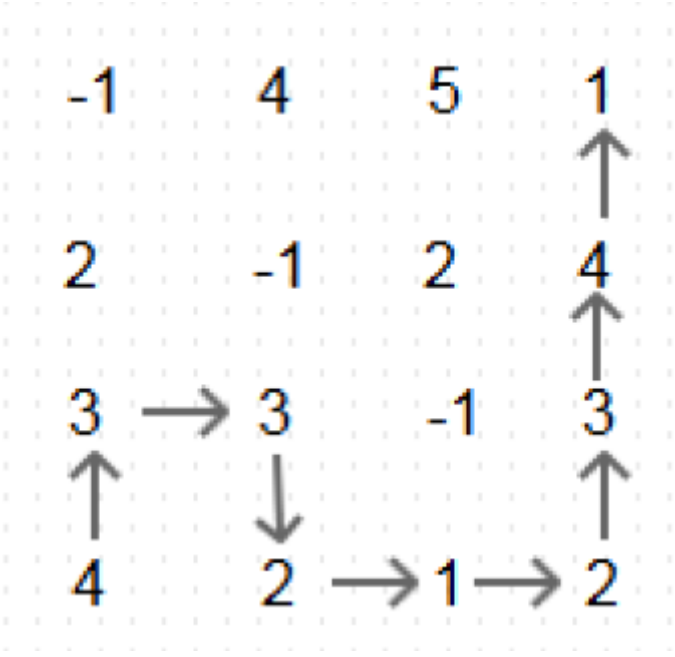
Input

```
4 4
-1 4 5 1
2 -1 2 4
3 3 -1 3
4 2 1 2
```

output

```
23
```

Path is as shown below



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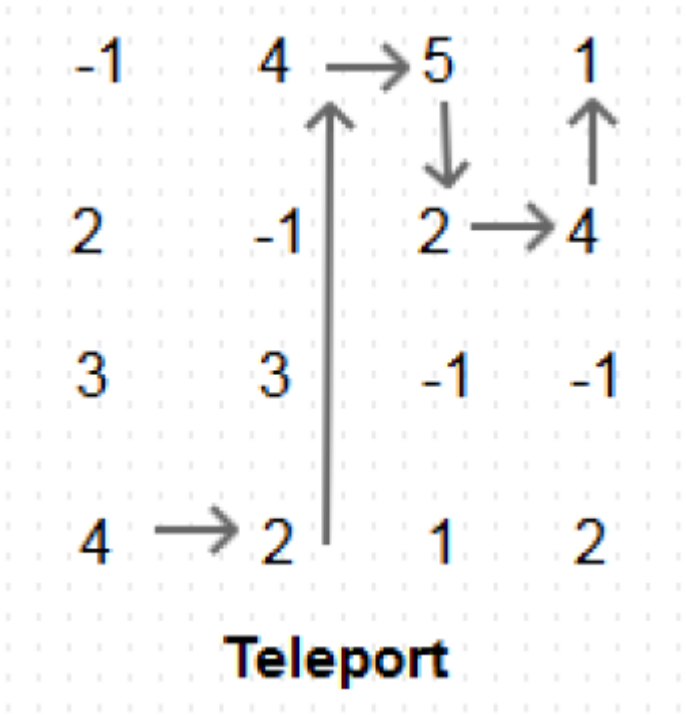
Input

```
4 4
-1 4 5 1
2 -1 2 4
3 3 -1 -1
4 2 1 2
```

output

```
16
```

Path is as shown below



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[Exam2] Travel Information Center

Aps Island has many cities. In the summer, many travellers will come to the island and attend festive events in different cities. The festive events in Aps Island are crazy. Once it starts, it will never end. In the following sentences, the cities which have festive events are called festive cities.

At the beginning, only city No. 1 is festive city. If a new city becomes festive city, the government will tell the information center about this news.

Everyday, the information center will receive many inquiries from travellers from different cities of this land. They want to know the closest festive city, and calculate the distance (If current city has festive event, the distance is 0).

Due to the growing number of the travellers, the information center is overloaded. The government wants to fix the problem by developing a system to handle the inquiries automatically.

As a fact, cities in Aps Island are connected with highways(bidirectional, length of every highway is 1). Any two cities are connected directly or indirectly, and there is ONLY one path between any 2 cities.

Input

There are two integers in the first line, n ($2 \leq n \leq 10^5$) and m ($1 \leq m \leq 10^5$), n is the number of cities in the Aps Island and m is the number of queries. The coming n-1 lines are the highways which connect two cities. In the line, there are two integers ai and bi ($1 \leq ai, bi \leq n, ai \neq bi$), representing two cities. Each line means the highway connecting the two cities.
Next m lines are inquiries from travellers or news from government. Each line has two integers qi and ci ($1 \leq qi \leq 2, 1 \leq ci \leq n$). If $qi = 1$, the government announces a new festive city ci. If $qi = 2$, you have to find and print the shortest distance from the city ci to the closest festive city.

Output

Results from each (qi = 2) Questions. Print every result with a new line.

Limits

- Memory limit per test: 256 megabytes
- Time limit per test: The faster the better

Compile & Environment

C++

```
g++ Main.cc -o Main -fno-asm -Wall -lm --static -std=c++0x -DONLINE_JUDGE
```

Java

Java 7
Maximum stack size is 50m

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Skeleton Code

Java

```
public class Main {
	public static void main(String[] args) {
		// TODO: Implement your program
	}
}
```

C++

```
int main(){
	// TODO: Implement your program
}
```

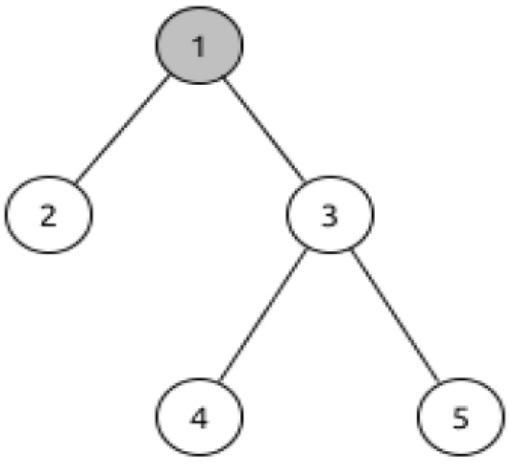
Sample Test

input

```
5 5
1 2
1 3
3 4
3 5
2 5
2 3
1 3
2 3
2 4
```

output

```
2
1
0
1
```



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