- An Example to show how to run java code through cmd
  Delete `package`
  javac LectureTwo.java
  java LectureTwo HelloWorld
- New Data Structure ArrayList
  Why do we need ArrayList when we already have the array?
  How to construct?
  How to add item(s)?
  How to removeitem(s)?
  How to access item(s)?
  How to update an item?
  How to get the size of the ArrayList?
  How to loop through the ArrayList?
  Sort an ArrayList
- New Data Structure HashMap
  Why do we need HashMap?
  What is the difference between HashMap and ArrayList?
  How to construct Hashmap?
  How to add an entry in HashMap?
  How to remove an entry in HashMap?
  How to access an entry in HashMap?
  How to update an entry in HashMap?
  How to get the size of the HashMap?
  How to loop through the HashMap?
  Can we sort the HashMap?
- Review of last week's CCC questions (2014Q1, 2013Q1, 2012Q1, 2011Q1)
- How to Submit your work to CCC online grader?
- Define a function/method in java

Answers to questions After Lecture one:

- Explain the meaning of public; static; void;

***public** is a **Java** keyword which declares a member's access as **public**. **Public** members are visible to all other classes. This means that any other class can access a **public** field or method.*

*In **Java**, **static is** a keyword used to describe how objects are managed in memory. **It means that** the **static** object belongs specifically to the class, instead of instances of that class.*

***void** is a **Java** keyword. Used at method declaration and definition to specify that the method does not return any type, the method returns **void**.*

- What does the main function mean in a class?

- How to read string/char/int from JAVA console?

```
3 import java.io.BufferedReader;
4 import java.io.IOException;
5 import java.io.InputStreamReader;
6
7 public class NextInLine {
8     public static void main(String[] args) throws IOException {
9         BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
```

- How to output the result to the JAVA console?
  System.out. println(String);
- What is the difference between comparison and assignment?
  Comparison returns true/false. Assignment is assigning a value to a variable.
- What is the result of comparison?
  boolean: true/false
- What is the consequence when you forget the `break` between each case in the switch statement?
  It will go to the next switch case.
- What is the usage of default in switch statement
  It will be run when no case is matched.
- How do you exit the loop without finishing it?
  Break
- Can we extend the array in java?
  No, array in java is not extendable. It is fixed size when initialized!

CCC 真题

Problem J2: Vote Count

Problem Description
A vote is held after singer A and singer B compete in the final round of a singing competition.

Your job is to count the votes and determine the outcome.

Input Specification
The input will be two lines. The first line will contain V $(1 \leq V \leq 15)$, the total number of votes. The second line of input will be a sequence of V characters, each of which will be A or B, representing the votes for a particular singer.

Output Specification
The output will be one of three possibilities:

- `A`, if there are more A votes than B votes;
- `B`, if there are more B votes than A votes;
- `Tie`, if there are an equal number of A votes and B votes.

Sample Input 1
```
6
ABBABB
```

Output for Sample Input 1
```
B
```

Sample Input 2
```
6
ABBABA
```

Output for Sample Input 2
```
Tie
```

Problem J2: Rotating letters

Problem Description
An artist wants to construct a sign whose letters will rotate freely in the breeze. In order to do this, she must only use letters that are not changed by rotation of 180 degrees: I, O, S, H, Z, X, and N.

Write a program that reads a word and determines whether the word can be used on the sign.

Input Specification
The input will consist of one word, all in uppercase letters, with no spaces. The maximum length of the word will be 30 letters, and the word will have at least one letter in it.

Output Specification
Output `YES` if the input word can be used on the sign; otherwise, output `NO`.

Sample Input 1
```
SHINS
```

Output for Sample Input 1
```
YES
```

Sample Input 2
```
NOISE
```

Output for Sample Input 2
```
NO
```

Problem J2: Sounds fishy!

Problem Description
A fish-finder is a device used by anglers to find fish in a lake. If the fish-finder finds a fish, it will sound an alarm. It uses depth readings to determine whether to sound an alarm. For our purposes, the fish-finder will decide that a fish is swimming past if:

- there are four consecutive depth readings which form a strictly increasing sequence (such as 3 4 7 9) (which we will call "Fish Rising"), or
- there are four consecutive depth readings which form a strictly decreasing sequence (such as 9 6 5 2) (which we will call "Fish Diving"), or
- there are four consecutive depth readings which are identical (which we will call "Constant Depth").

All other readings will be considered random noise or debris, which we will call "No Fish."

Your task is to read a sequence of depth readings and determine if the alarm will sound.

Input Specification
The input will be four positive integers, representing the depth readings. Each integer will be on its own line of input.

Output Specification
The output is one of four possibilities. If the depth readings are increasing, then the output should be `Fish Rising`. If the depth readings are decreasing, then the output should be `Fish Diving`. If the depth readings are identical, then the output should be `Fish At Constant Depth`. Otherwise, the output should be `No Fish`.

Sample Input 1
```
30
10
20
20
```

Output for Sample Input 1
```
No Fish
```

Sample Input 2
```
1
10
12
13
```

Output for Sample Input 2
```
Fish Rising
```

Problem J2: Who Has Seen The Wind

Problem Description

Margaret has looked at the wind floating over the prairies for a long time. After these observations, she has created a formula that will describe the altitude of a weather balloon launched from her house. In particular, her equation predicts the altitude A (in metres above the ground) at hour t after launching her balloon is:

$$A = -6t^4 + ht^3 + 2t^2 + t$$

where h is an integer value representing the humidity as a value between 0 and 100 inclusive.

Margaret is curious at what the earliest hour is (if any) that her weather balloon will hit the ground after launch, so long as it is no more than the maximum time, M, that Margaret is willing to wait. You can assume that the weather balloon touches ground when $A \leq 0$.

In order to do this, your program should use the formula to calculate the altitude when $t = 1$, $t = 2$, and so on, until the balloon touches the ground or $t = M$ is reached.

Input Specification

The input is two non-negative integers: h, the humidity factor, followed by M, the maximum number of hours Margaret will wait for the weather balloon to return to ground. You can assume $0 \leq h \leq 100$ and $0 < M < 240$.

Output Specification

The output will be one of the following possibilities:

- `The balloon does not touch ground in the given time.`
- `The balloon first touches ground at hour:`
  `T`

where T is a positive integer value representing the earliest hour when the balloon has altitude less than or equal to zero.

Sample Input 1

```
30
10
```

Output for Sample Input 1

```
The balloon first touches ground at hour:
6
```

Sample Input 2

```
70
10
```


Output for Sample Input 2

```
The balloon does not touch ground in the given time.
```

Problem J3: Double Dice

Problem Description
Antonia and David are playing a game.

Each player starts with 100 points.

The game uses standard six-sided dice and is played in rounds. During one round, each player rolls one die. The player with the lower roll loses the number of points shown on the higher die. If both players roll the same number, no points are lost by either player.

Write a program to determine the final scores.

Input Specification
The first line of input contains the integer n ($1 \leq n \leq 15$), which is the number of rounds that will be played. On each of the next n lines, will be two integers: the roll of Antonia for that round, followed by a space, followed by the roll of David for that round. Each roll will be an integer between 1 and 6 (inclusive).

Output Specification
The output will consist of two lines. On the first line, output the number of points that Antonia has after all rounds have been played. On the second line, output the number of points that David has after all rounds have been played.

Sample Input
```
4
5 6
6 6
4 3
5 2
```

Output for Sample Input
```
94
91
```

Explanation of Output for Sample Input
After the first round, David wins, so Antonia loses 6 points. After the second round, there is a tie and no points are lost. After the third round, Antonia wins, so David loses 4 points. After the fourth round, Antonia wins, so David loses 5 points. In total, Antonia has lost 6 points and David has lost 9 points.

Problem J3: From 1987 to 2013

Problem Description
You might be surprised to know that 2013 is the first year since 1987 with distinct digits. The years 2014, 2015, 2016, 2017, 2018, 2019 each have distinct digits. 2012 does not have distinct digits, since the digit 2 is repeated.

Given a year, what is the next year with distinct digits?

Input Specification
The input consists of one integer Y ($0 \leq Y \leq 10000$), representing the starting year.

Output Specification
The output will be the single integer D, which is the next year after Y with distinct digits.

Sample Input 1
```
1987
```

Output for Sample Input 1
```
2013
```

Sample Input 2
```
999
```

Output for Sample Input 2
```
1023
```