ICPC Assiut Community

Newcomers Training

Loops

ICPC Assiut
community

Training System

- There will be weekly session **Every Saturday**
- There will be a weekly online Practice 3H (**Tue - Wed - Thu**)
- There will be a weekly online contest **(Friday , 7 PM)**
  - **Up Solve** , **Up Solve** , **Up Solve**.
- There will be a weekly sheet.
- After 1 weeks there will be **Filtration**.
- After the end of Training there will be Qualification Contest to join Junior Training.
- Everyone will have **Points** (Attend , Solve problem in sheet , Contest)
- This Training is **Totally Free**.
- Everyone in training will be assigned to Mentor
- Sheet Explain , and join Group in Codeforces.

Points System

- Every Trainee will have A score (Points)
- Every Trainee will gain **20 Points** for every Problem he solve in Practice sheet.
- After every contest the **1st** will take **1000 Points**, the **2nd** will take 90% from **1st**, the **3rd** will take 90% from **2nd**, and so on ...

Your Goals in Training

- Programming Concept (Data Types , Conditions , Loops , Arrays , Functions).
- C++ Language
- How to Search.
- Debug , Test , Fast in Coding .
- Strategy in contest.
- Organize code , Style.
- Learn how to learn
- Build New Network .
- Increase Thinking Skills.
- Building an organized way of thinking in attacking problems.

Rules

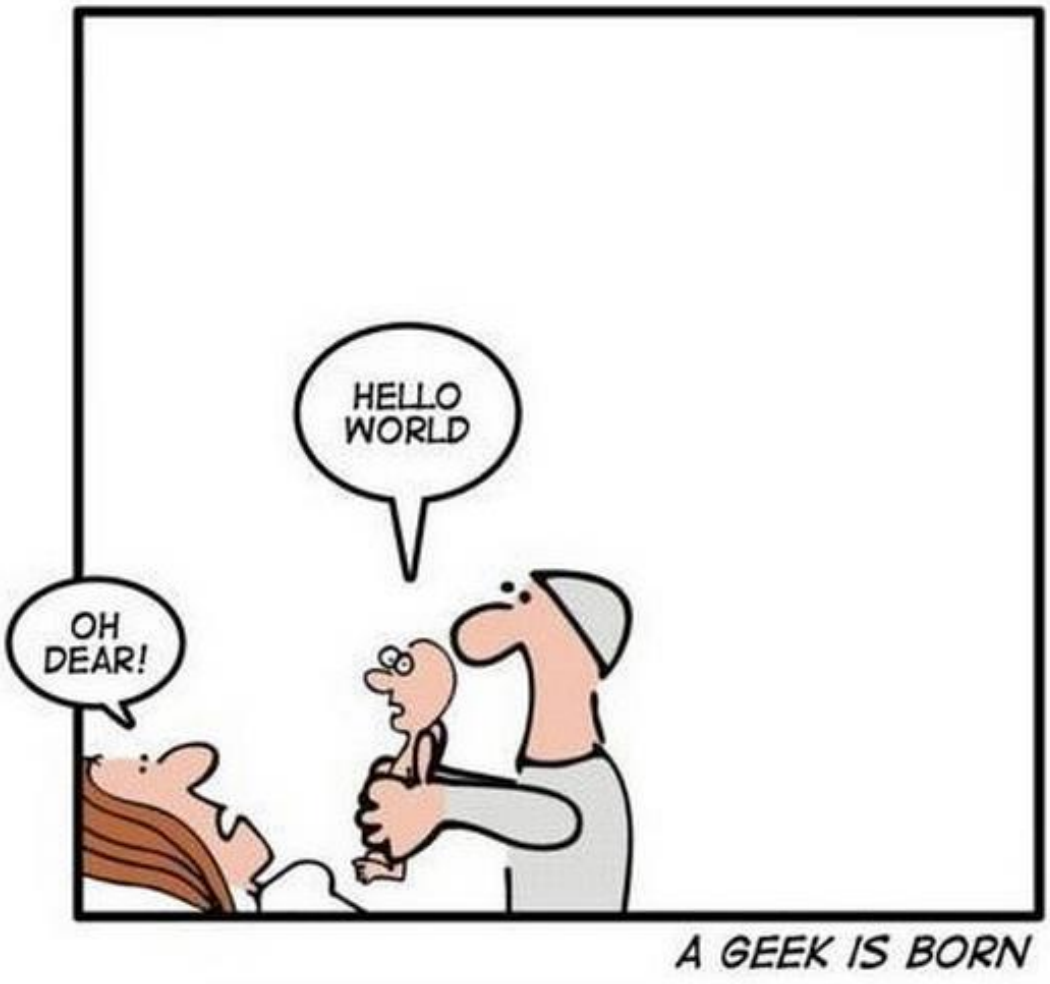
- Session **Every week** .
- Last time to attend session after it start within **30 minutes**.
- Should solve **at least 50%** problems weekly sheet.
- **Must** join contest and keep trying to the last minute.
- **Should** attend with your laptop.
- In the end of the training there will be **Certificate** to everyone who solve **at least 80%** of problems.
- Top 10 in Training according to points will take special awards

Errors

- **Syntax Errors – Compilation Errors**
  - Errors in programming language rules.
  - You can use the compiler or interpreter to uncover syntax errors.
  - You must have a good working knowledge of error messages to discover the cause of the error.
- **Logic or Meaning Errors**
  - Errors that indicate the logic used when coding the program failed to solve the problem.
  - You do not get error messages with logic errors.
  - Your only clue to the existence of logic errors is the production of wrong solutions.
- **Run-time Errors (Exceptions)**
  - Code does something illegal when it is run (hence runtime) E.g., divide by zero

Loops

- If we want to print “Hello world” 10 times.
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “
  - “Hello world “



Loops

- If we want to print “Hello world“ 1000 times ?
  It's too boring, right ?

For this, we will make a **Loop**

So, What is the **Loop** ??

Loops

- **Loops** : repeat a statement a certain number of times, or while a condition is Satisfied.

They are introduced by the keywords **while**, **do-while**, and **for**.

Loops

- **for** loop **:** The for loop is designed to iterate a number of times.

Its syntax is:

```
for (initialization; condition; increase)  {
        // statements
}
```

Loops

A simple for loop code

```
#include <iostream>
using namespace std;
int main() {
    for(int i = 0; i < 100; i++){

        cout << "Hello world" << endl;

    }
    return 0;
}
```

Loops

While loops: While loops have only a condition in its syntax

"while the condition is true, go in the loop".

Syntax :

```
while( condition ) {
        // Statement
}
```

```
int main() {
    int i = 0;
    while(i < 100){
        cout << "Hello world" << endl;
        i++;
    }
    return 0;
}
```

Loops

- **do-while** loop : The **do-while** loop is a very similar loop,

  whose syntax is:

```
do {

    // Statements

} while (condition);
```

Loops

A simple do-while loop code

```
int main() {
    int i = 0;
    do {
        cout << "Hello world" << endl;
        i++;
    }while(i < 100);
    return 0;
}
```

Problems

1. Write a program to print numbers from 1 to 10

1. Write a program to count numbers of odd and even between 1 and 10

1. Write a program to take a number from user and print its factorial.

1. Write a program to take a 10 numbers from user and print largest and the smallest one .

Loops

- **Break statement**

  when the compiler read this statement, it exit from the loop and ignore the remainder statements

  In this code : when **a** is even, the loop is break

```
for(int i = 0; i < 10; i++){
        int a;
        cin >> a;
        if(a % 2 == 0){
            break;
        }
    }
```

- **Continue statement**

  when the compiler read this statement, it ignore the remainder statements and go to the next time in the loop

  In this code, **sum** will have the summation of odd numbers

```
int sum = 0;
    for(int i = 0; i < 10; i++){
        int a;
        cin >> a;
        if(a % 2 == 0){
            continue;
        }
        sum = sum + i;
    }
```

Problems

1. Write a program take a numbers from user until enter 0.

1. Write a program to take number from user and determine it`s prime or not

Nested Loops

Loop inside Loop

Ex :

```
int main() {
    for(int i = 0; i < 5; i++){
        for(int j = 0; j < 5; j++){
            cout << "*" << " " ;
        }
            cout<< "\n" ;
    }
}
```

Problems

- Write a program to print

  #

  ##

  ###

- Write a program to print

  ####

  ###

  ##

  #

Scopes, Global, Local

```
#include <iostream>
using namespace std;
int main() {
    for(int i = 0; i < 10; i++){
        cout << i << endl;
    }
    cout << i << endl;
}
```

Notes

- **Test Cases.**
- **Infinity loop.**
- **break in nested loops**
- **loop counter can increase by 1 or more and decrease**
- **fast code , '\n'**

```
int main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
}
```

For more information about **Loops** visit this Link

Now it's time to practise and solve the problems of Loops

Loops Sheet

Good luck <3