

This is the manual for the DOMjudge programming contest control system version 10.0. The summary below outlines the working of the system interface. It is meant as a quick introduction, to be able to start using the system. It is however strongly advised that your team reads the entire document. There are specific details of this contest control system that might become of importance when you run into problems.

Summary

The web interface of DOMjudge can be found at https://example.com/domjudge/team. See the three figures on the next pages for an impression.

Solutions have to read all input from 'standard in' and write all output to 'standard out' (also known as console). You will never have to open (other) files. Also see our *code examples*.

You can submit solutions in two ways:

Command-line
: Use `submit <filename>`. If your filename is of the form `<problem>.<extension>` where `<problem>` is the label of the problem and `<extension>` is a standard extension for your language, then these will automatically be detected. It will also try to auto-detect the main class (for Java and Kotlin) or the main file (for Python). You can override these auto-detections; for a complete reference of all options and examples, see `submit --help`.

Web interface
: From your team page, https://example.com/domjudge/team, click the green **Submit** button in the menu bar. Select the files you want to submit. By default, the problem is selected from the base of the (first) filename and the language from the extension. The web interface tries to auto-detect the main class (for Java and Kotlin) or the main file (for Python) from the file name. Double check that the guess is correct before submitting.

Viewing scores, submissions and sending and reading clarification requests and replies is done through the web interface at https://example.com/domjudge/team.

Use the problemset page to get:

- get all attachments such as 'testing tools' for each problem,
- view indicators for problem difficulty (submission and acceptance rates) across contest intervals (hover over the boxes for exact numbers),
- get the problem statement and clarifications on those statements
- see the time & memory limits.

1 Overview of the interface

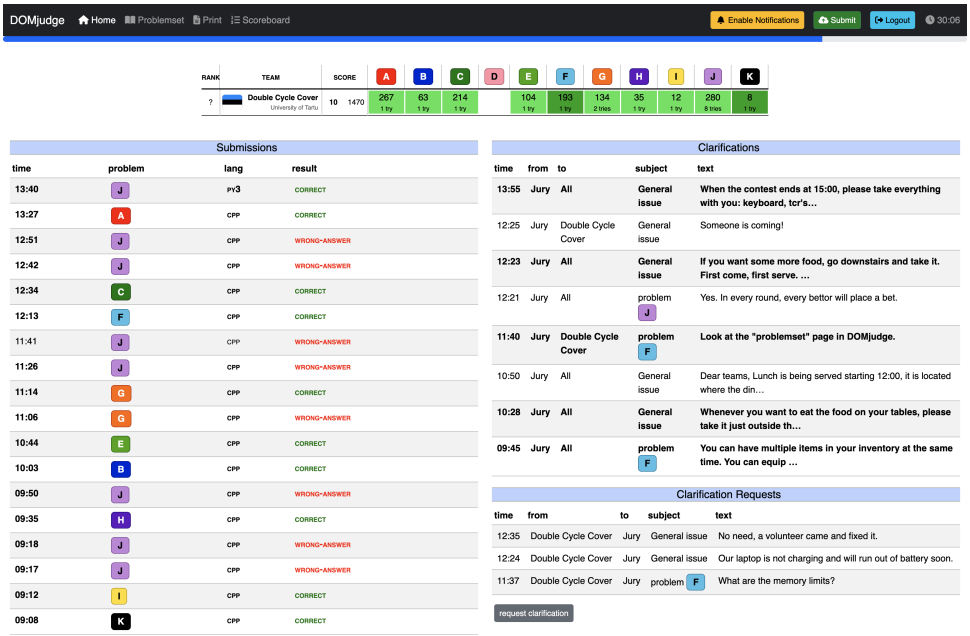


Fig. 1: The team web interface overview page.

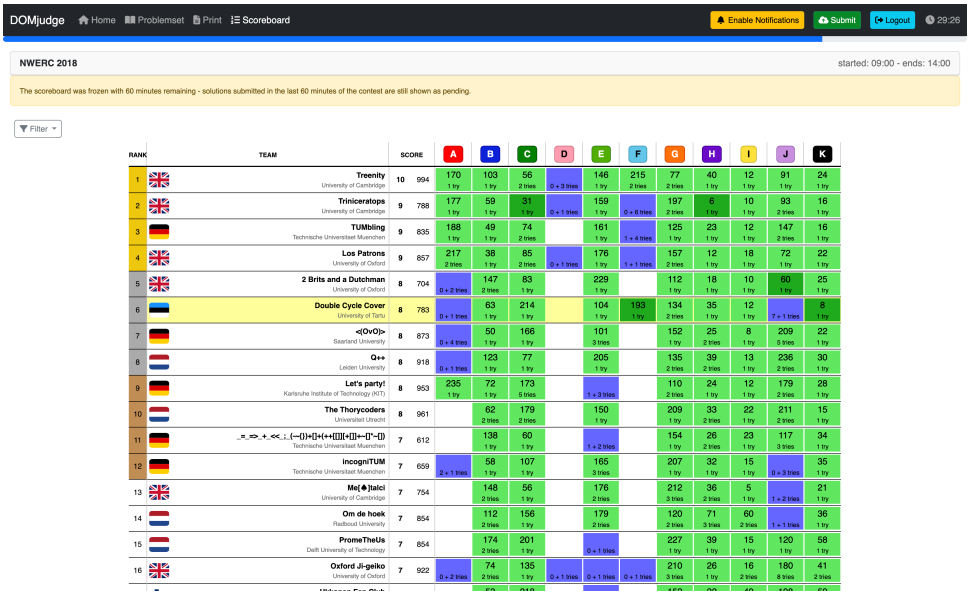


Fig. 2: The scoreboard webpage.

2 Submitting solutions

Submitting solutions can be done in two ways: with the command-line program `submit` (if installed) or using the web interface.

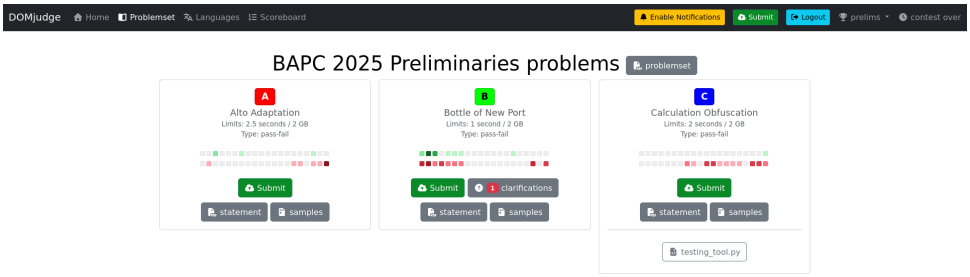


Fig. 3: The problemset webpage.

2.1 Command-line: `submit`

Syntax:

```
submit [options] filename.ext ...
```

The submit program takes the name (label) of the problem from `filename` and the programming language from the extension `ext`.

For Java it uses the filename as a guess for the main class; for Kotlin it capitalizes filename and appends `Kt` to compute the guess for the main class name. For Python, the first filename is used as a guess for the main file. These guesses can be overruled with the options `-p problemname`, `-l languageextension` and `-e entry_point`.

See `submit --help` for a complete list of all options, extensions and some examples.

`submit` will check your file and warns you for some problems: for example when the file has not been modified for a long time or when it's larger than the maximum source code size (see *the section on restrictions*).

Filenames must start with an alphanumerical character and may contain only alphanumerical characters and `+.\_-`. You can specify multiple files to be part of this submission (see section "*How are submissions being judged?*").

Then `submit` displays a summary with all details of your submission and asks for confirmation. Check whether you are submitting the right file for the right problem and language and press `y` to confirm. `submit` will report a successful submission or give an error message otherwise.

2.2 Web interface

Judges may distribute the digital versions of the problems either individually per or as full problemset through DOMjudge. If the judges issue a clarification for a problem, it will be sent out and displayed in the corresponding problem card. The judges may provide additional files for a problem, such as extra inputs, testing tools, or other relevant attachments. You can use the problemset page to help decide which problem to solve next. DOMjudge shows the live contest progress, including the number of successful and failed submissions for each problem. Use the info from the problemset page and the scoreboard to gauge problem difficulty. A good rule of thumb is: Problems solved often and early in the contest are likely easier. Problems solved infrequently or only later in the contest are typically more difficult.

Solutions can be submitted from the web interface at https://example.com/domjudge/team. Click the green *Submit* button at the menu bar on every page. Click the file selection button and select one or multiple files for submission. DOMjudge will try to determine the problem, language and main class (in case of Java and Kotlin) or main file (in case of Python) from the base and extension of the first filename. Otherwise, select the appropriate values. Filenames must start with an alphanumerical character and may contain only alphanumerical characters and `+.\_-`.

After you hit the submit button and confirm the submission, you will be redirected back to your submission list page. On this page, a message will be displayed that your submission was successful and the submission will be present in the list. An error message will be displayed if something went wrong.

3 Viewing the results of submissions

The left column of your team web page shows an overview of your submissions. It contains all relevant information: submission time, programming language, problem and status. The address of your team page is https://example.com/domjudge/team.

The top of the page shows your team's row in the scoreboard: your position and which problems you attempted and solved. Via the menu you can view the public scoreboard page with the scores of all teams. Many cells will show additional "title text" information when hovering over them. The score column lists the number of solved problems and the total time including penalty time. Each cell in a problem column lists the number of submissions, and if the problem was solved, the time of the first correct submission in minutes since contest start. This is included in your total time together with any penalty time incurred for previous incorrect submissions.

Optionally the scoreboard can be 'frozen' some time before the end of the contest. The full scoreboard view will not be updated anymore, but your team row on your overview page will be. Your team's rank will then be displayed as '?'.

Finally, via the top menu you can also view the list of problems and view/download problem texts and sample data, if provided by the judges.

3.1 Possible results

A submission can have the following results (not all of these may be available depending on configuration of the system):

CORRECT
: The submission passed all tests: you solved this problem! *Correct submissions do not incur penalty time.*

COMPILER-ERROR
: There was an error when compiling your program. On the submission details page you can inspect the exact error (this option might be disabled). Note that when compilation takes more than 30 seconds, it is aborted and this counts as a compilation error. *Compilation errors do not incur penalty time. The administrator of the contest can change this scoring.*

TIMELIMIT
: Your program took longer than the maximum allowed time for this problem. Therefore it has been aborted. This might indicate that your program hangs in a loop or that your solution is not efficient enough.

RUN-ERROR
: There was an error during the execution of your program. This can have a lot of different causes like division by zero, incorrectly addressing memory (e.g. by indexing arrays out of bounds), trying to use more memory than the limit, reading or writing to files, etc. Also check that your program exits with exit code 0!

NO-OUTPUT
: Your program did not generate any output. Check that you write to standard out.

OUTPUT-LIMIT
: Your program generated more output than the allowed limit. The solution is considered incorrect.

WRONG-ANSWER
: The output of your program was incorrect. This can happen simply because your solution is not correct, but remember that your output must comply exactly with the specifications of the judges. See *testing* below for more details.

TOO-LATE
: Bummer, you submitted after the contest ended! Your submission is stored but will not be processed anymore.

The judges may have prepared multiple test files for each problem. DOMjudge will report back the first highest priority non-correct result as verdict. *Your administrator can decide on different priorities for non-correct results.*

4 Clarifications

All communication with the judges is to be done through clarification messages. These can be found in the right column on your team page. Both clarification replies from the judges and requests sent by you are displayed there.

There is also a button to submit a new clarification request to the judges; you can associate a specific problem or one of the general categories to a request. This clarification request is only readable for the judges. The judges can answer specifically to your team or send a reply to everyone if it is relevant for all.

5 How are submissions being judged?

The DOMjudge contest control system is fully automated. Judging is done in the following way:

5.1 Submitting solutions

With the `submit` program or the web interface (see *the section on submitting*) you can submit a solution to a problem to the judges. Note that you have to submit the source code of your program (and not a compiled program or the output of your program).

On the contest control system your program enters a queue, awaiting compilation, execution and testing on one of the autojudges.

5.2 Compilation

Your program will be compiled on an autojudge machine running Linux. All submitted source files will be passed to the compiler which generates a single program to run. For Java and Kotlin the given main class will be checked; for Python we do a syntax check using the `py_compile` module.

5.3 Testing

After your program has compiled successfully it will be executed and its output compared to the output of the judges. Before comparing the output, the exit status of your program is checked: if your program exits with a non-zero exit code, the result will be a run-error even if the output of the program is correct! There are some restrictions during execution. If your program violates these it will also be aborted with a run-error, see *the section on restrictions*.

When comparing program output, it has to exactly match to output of the judges, except that some extra whitespace may be ignored (this depends on the system configuration of the problems). So take care that you follow the output specifications. In case of problem statements which do not have unique output (e.g. with floating point answers), the system may use a modified comparison function. This will be documented in the problem description.

5.4 Restrictions

Submissions are run in a sandbox to prevent abuse, keep the judging system stable and give everyone clear and equal environments. There are some restrictions to which all submissions are subjected:

compile time
: Compilation of your program may take no longer than 30 seconds. After that, compilation will be aborted and the result will be a compile error. In practice this should never give rise to problems. Should this happen to a normal program, please inform the judges right away.

source size
: The total amount of source code in a single submission may not exceed 256 kilobytes, otherwise your submission will be rejected.

memory
: The judges will specify how much memory you have available during execution of your program. This may vary per problem. It is the total amount of memory (including program code, statically and dynamically defined variables, stack, Java/Python VM, ...)! If your program tries to use more memory, it will most likely abort, resulting in a run error.

creating new files
: Do not create new files. The sandbox will not allow this and the file open function will return a failure. Using the file without handling this error can result in a runtime error depending on the submission language.

number of processes
: You are not supposed to explicitly create multiple processes (threads). This is to no avail anyway, because your program has exactly 1 processor core fully at its disposal. DOMjudge executes submissions in a sandbox where a maximum of 64 processes can be run simultaneously (including processes that started your program).

  People who have never programmed with multiple processes (or have never heard of "threads") do not have to worry: a normal program runs in one process.

6 Code examples

Below are a few examples on how to read input and write output for a problem.

The examples are solutions for the following problem: the first line of the input contains the number of testcases. Then each testcase consists of a line containing a name (a single word) of at most 99 characters. For each testcase output the string `Hello <name>!` on a separate line.

Sample input and output for this problem:

Input	Output
3 world Jan SantaClaus	Hello world! Hello Jan! Hello SantaClaus!

Note that the number `3` on the first line indicates that 3 testcases follow.

What follows is a number of possible solutions to this problem for different programming languages.

Listing 1: *A solution in C*

```c
#include <stdio.h>

int main() {
        int i, ntests;
        char name[100];

        scanf("%d\n", &ntests);

        for (i = 0; i < ntests; i++) {
                scanf("%s\n", name);
                printf("Hello %s!\n", name);
        }
}
```

Listing 2: *A solution in C++*

```cpp
#include <iostream>
#include <string>

using namespace std;

int main() {
        int ntests;
        string name;

        cin >> ntests;
        for (int i = 0; i < ntests; i++) {
                cin >> name;
                cout << "Hello " << name << "!" << endl;
        }
}
```

Listing 3: *A solution in Java*

```java
// Note: do not use any 'package' statements

import java.util.*;

class Main {
        public static void main(String[] args) {
                Scanner scanner = new Scanner(System.in);
                int nTests = scanner.nextInt();

                for (int i = 0; i < nTests; i++) {
                        String name = scanner.next();
                        System.out.println("Hello " + name + "!");
                }
        }
}
```

Listing 4: *A solution in Kotlin*

```kotlin
// Note: do not use any 'package' statements

import java.util.*

fun main(args: Array<String>) {
    var scanner = Scanner(System.`in`)
    val nTests = scanner.nextInt()
    for (i in 1..nTests) {
            System.`out`.format("Hello %s!%n", scanner.next())
    }
}
```

Listing 5: *A solution in Python*

```python
import sys

n = int(input())
for i in range(n):
    name = sys.stdin.readline().rstrip('\n')
    print('Hello %s!' % (name))
```

7 Improvements to DOMjudge

The DOMjudge team would like your feedback. We do not receive much feedback from participants. If you find something lacking or have improvement ideas, please report them. See https://www.domjudge.org/development.