

Judgement Details

Judge System

The bottom line is that we have the same computers as yours to run your programs in the judge room. The judge system, however, will run them inside a *sandboxed environment*, i.e. with protections to prevent the system from being damaged. Specifically:

- Memory usage is limited to 2 GB in the environment. Note it is the total amount, not the amount you can use exclusively in your programs.
- The stack size is set unlimited (in C/C++), only capped by the total memory limit.
- Multi-processing or multi-threading is discouraged and unlikely beneficial, though not prohibited. Remember your programs will run on a single core of processor. The total number of processes is limited to 15, including ones the system may create outside your programs.
- It is *never* recommended to run external commands.¹ It is technically possible but probably does not work as you expect.

If you have no idea about what these mean — no worries. Just remember your programs should use the standard input and output, not files. Everything else should be unrelated to you.

There are a couple more restrictions that apply:

- The total amount of source code must not exceed 256 KB in each submission.
- Your program must compile within 30 seconds.

See the DOMjudge team manual for more details about these restrictions.

¹ e.g. using `execve()` or `system()` in C/C++; `ProcessBuilder` or `Runtime.exec()` in Java.

Compile Options

The judge system use the following commands internally to compile and run the submitted programs. These commands are also available on your workstation.

- **C** `compilegcc` (no “run” command)
- **C++** `compileg++` (no “run” command)
- **Java** `compilejava` / `runjava`
- **Python 2** `compilepython2` / `runpython2`
- **Python 3** `compilepython3` / `runpython3`
- **Kotlin** `compilekotlin` / `runkotlin`

For your reference, below are how your programs will be compiled and run. “\$@” is substituted with your source file(s); “\$DEST” is the name of the binary (which is “./a.out” by default) and is chosen arbitrarily by the system.

C	
Compile	<code>gcc -g -O2 -std=gnu11 -static -o"\$DEST" "\$@" -lm</code>
Run	<code>"\$DEST" < <u>infile</u> > <u>outfile</u></code>
C++	
Compile	<code>g++ -g -O2 -std=gnu++14 -static -o"\$DEST" "\$@"</code>
Run	<code>"\$DEST" < <u>infile</u> > <u>outfile</u></code>
Java	
Compile	<code>javac -encoding UTF-8 -sourcepath . -d . "\$@"</code>
Run ²	<code>java -Dfile.encoding=UTF-8 -XX:+UseSerialGC -Xss64m -Xms1920m -Xmx1920m <u>MainClass</u> < <u>infile</u> > <u>outfile</u></code>
Python 2 (PyPy)	
Compile ³	<code>python2 -m py_compile "\$@"</code>
Run	<code>pypy "\$@" < <u>infile</u> > <u>outfile</u></code>
Python 3	
Compile ³	<code>python3 -m py_compile "\$@"</code>
Run	<code>/usr/local/py3-venv/bin/python3 "\$@" < <u>infile</u> > <u>outfile</u></code>
Kotlin	
Compile	<code>kotlinc -d . "\$@"</code>
Run ²	<code>kotlin -Dfile.encoding=UTF-8 -J-XX:+UseSerialGC -J-Xss64m -J-Xms1920m -J-Xmx1920m <u>MainClass</u> < <u>infile</u> > <u>outfile</u></code>

² DOMjudge will detect the main class automatically; you do not have to name it Main. See the DOMjudge team manual for details.

³ Python’s “Compile” commands only verify the syntax. *.pyc files will *not* be used in the real run.

Submission Results

Your submissions will eventually be responded with one of the following results:

Accepted

- **CORRECT** — Your program ran successfully and passed all test cases.

Rejected with 20-minute penalty

- **WRONG-ANSWER** — Your program neither crashed nor exceeded the time limit, but produced incorrect output for some test case(s).
- **NO-OUTPUT** — Your program did not produce any output for some test case(s).
- **TIMELIMIT** — Your program did not finish within the time limit for some test case.
- **RUN-ERROR** — Your program crashed with some test case, or otherwise exited with a non-zero exit status (e.g. because of missing “`return 0;`” in C/C++).
- **OUTPUT-LIMIT** — Your program produced excessive output (> 4 MB) for some test case.

Rejected with no penalty

- **COMPILE-ERROR** — Your program did not compile on the judging environment. You can consult error message(s) on the submission details page.
- **TOO-LATE** — Your program was submitted after the contest was over.⁴

Note to Python Users

The judges have solved all problems in C++ and Java, but not necessarily in Python. They do not guarantee that all problems can be solved in Python.

Only syntax errors will be reported as **COMPILE-ERROR**. Other types of errors, such as `NameError` or `ModuleNotFoundError`, will result in **RUN-ERROR** and incur 20-minute penalty.

It is fine, though not needed, to start your scripts with an interpreter directive (line starting with “`#!`”, also known as *shebang*).⁵

The full list of modules available in the judge system can be found in the following pages. Remember to run your scripts with `runpython2` / `runpython3`. It ensures the environment to have the same set of modules as the judge system.

⁴ Note it does not mean your programs need to be *judged* before the end of contest. Your programs will be judged as long as submitted (“*queued*”) within the contest time.

⁵ Some past versions of DOMjudge refused scripts that contain a shebang.

Available Modules in Python 2

BaseHTTPServer	_resource_build	formatter	quopri
Bastion	_resource_cffi	fpformat	random
CDROM	_scproxy	fractions	re
CGIHTTPServer	_sha	ftplib	readline
Canvas	_sha256	functools	repr
ConfigParser	_sha512	future_builtins	resource
Cookie	_socket	gc	rexec
DLFCN	_sqlite3	gdbm	rfc822
DLFCN_default	_sqlite3_build	genericpath	rlcompleter
DLFCN_mips	_sqlite3_cffi	getopt	robotparser
Dialog	_sre	getpass	runpy
DocXMLRPCServer	_ssl	gettext	sched
FileDialog	_strptime	glob	select
FixTk	_struct	greenlet	sets
HTMLParser	_structseq	grp	sgmllib
IN	_subprocess	gzip	sha
IN_alpha	_sysconfigdata	hashlib	shelve
IN_default	_syslog_build	heapq	shlex
IN_hppa	_syslog_cffi	hmac	shutil
IN_mips	_testcapi	hotshot	signal
IN_sparc	_testing	htmlentitydefs	site
MimeWriter	_threading_local	httplib	smtpd
Queue	_vmprof	httplib	smtplib
ScrolledText	_warnings	identity_dict	sndhdr
SimpleDialog	_weakref	idlelib	socket
SimpleHTTPServer	_weakrefset	ihooks	sqlite3
SimpleXMLRPCServer	abc	imaplib	sre
SocketServer	aifc	imghdr	sre_compile
StringIO	antigravity	imp	sre_constants
TYPES	anydbm	importlib	sre_parse
Tix	argparse	imputil	ssl
Tkconstants	array	inspect	stackless
Tkdnd	ast	io	stat
Tkinter	asynchat	itertools	statvfs
UserDict	asyncore	json	string
UserList	atexit	keyword	stringold
UserString	audiodev	lib2to3	stringprep
_LWPCookieJar	audioop	linecache	struct
_MozillaCookieJar	base64	locale	subprocess
__builtin__	bdb	logging	sunau
__future__	binascii	macpath	sunaudio
__pypy__	binhex	macurl2path	symbol
_abcoll	bisect	mailbox	symtable
_ast	bsddb	mailcap	sys
_audioop_build	bz2	markupbase	sysconfig
_audioop_cffi	cPickle	marshal	syslog
_cffi_backend	cProfile	math	tabnanny
_codecs	cStringIO	md5	tarfile

_codecs_cn	calendar	mhlib	telnetlib
_codecs_hk	cffi	mimertools	tempfile
_codecs_iso2022	cgi	mimetypes	termios
_codecs_jp	cgitb	mimify	test
_codecs_kr	chunk	mmap	textwrap
_codecs_tw	cmath	modulefinder	this
_collections	cmd	msilib	thread
_continuation	code	msvcrt	threading
_cppyy	codecs	multifile	time
_csv	codeop	multiprocessing	timeit
_ctypes	collections	mutex	tkColorChooser
_ctypes_test	colorsys	netrc	tkCommonDialog
_curses	commands	new	tkFileDialog
_curses_build	compileall	nntplib	tkFont
_curses_cffi	compiler	ntpath	tkMessageBox
_curses_panel	contextlib	nturl2path	tkSimpleDialog
_elementtree	cookielib	numbers	toaiff
_ffi	copy	opcode	token
_file	copy_reg	operator	tokenize
_functools	cpyext	optparse	tputil
_gdbm_build	crypt	os	trace
_gdbm_cffi	csv	os2emxpath	traceback
_hashlib	ctypes	parser	ttk
_io	ctypes_support	pdb	tty
_jitlog	curses	pickle	turtle
_locale	datetime	pickletools	types
_lsprof	dbhash	pipes	unicodedata
_marshal	dbm	pkgutil	unittest
_md5	decimal	platform	urllib
_minimal_curses	difflib	plistlib	urllib2
_multibytecodec	dircache	popen2	urlparse
_multiprocessing	dis	poplib	user
_numppyy	distutils	posix	uu
_osx_support	doctest	posixfile	uuid
_pickle_support	dumbdbm	posixpath	warnings
_pwdgrp_build	dummy_thread	pprint	wave
_pwdgrp_cffi	dummy_threading	profile	weakref
_pyio	email	pstats	webbrowser
_pypy_interact	encodings	pty	whichdb
_pypy_irc_topic	ensurepip	pwd	wsgiref
_pypy_testcapi	errno	py_compile	xdrlib
_pypy_wait	exceptions	pyclbr	xml
_pypy_winbase_build	faulthandler	pydoc	xmllib
_pypy_winbase_cffi	fcntl	pydoc_data	xmlrpclib
_pypyjson	filecmp	pyexpat	zipfile
_random	fileinput	pypyjit	zipimport
_rawffi	fnmatch	pyrepl	zlib

Available Modules in Python 3

<code>__future__</code>	<code>aifc</code>	<code>hmac</code>	<code>sched</code>
<code>_ast</code>	<code>antigravity</code>	<code>html</code>	<code>secrets</code>
<code>_asyncio</code>	<code>appdirs</code>	<code>html5lib</code>	<code>select</code>
<code>_bisect</code>	<code>argparse</code>	<code>http</code>	<code>selectors</code>
<code>_blake2</code>	<code>array</code>	<code>idna</code>	<code>setuptools</code>
<code>_bootlocale</code>	<code>ast</code>	<code>imaplib</code>	<code>shelve</code>
<code>_bz2</code>	<code>asynchat</code>	<code>imghdr</code>	<code>shlex</code>
<code>_codecs</code>	<code>asyncio</code>	<code>imp</code>	<code>shutil</code>
<code>_codecs_cn</code>	<code>asyncore</code>	<code>importlib</code>	<code>signal</code>
<code>_codecs_hk</code>	<code>atexit</code>	<code>inspect</code>	<code>site</code>
<code>_codecs_iso2022</code>	<code>audioop</code>	<code>io</code>	<code>sitecustomize</code>
<code>_codecs_jp</code>	<code>base64</code>	<code>ipaddress</code>	<code>six</code>
<code>_codecs_kr</code>	<code>bdb</code>	<code>itertools</code>	<code>smtpd</code>
<code>_codecs_tw</code>	<code>binascii</code>	<code>json</code>	<code>smtplib</code>
<code>_collections</code>	<code>binhex</code>	<code>keyword</code>	<code>sndhdr</code>
<code>_collections_abc</code>	<code>bisect</code>	<code>lib2to3</code>	<code>socket</code>
<code>_compat_pickle</code>	<code>builtins</code>	<code>linecache</code>	<code>socketserver</code>
<code>_compression</code>	<code>bz2</code>	<code>locale</code>	<code>spwd</code>
<code>_crypt</code>	<code>cProfile</code>	<code>lockfile</code>	<code>sqlite3</code>
<code>_csv</code>	<code>cachecontrol</code>	<code>logging</code>	<code>sre_compile</code>
<code>_ctypes</code>	<code>calendar</code>	<code>lzma</code>	<code>sre_constants</code>
<code>_ctypes_test</code>	<code>cgi</code>	<code>macpath</code>	<code>sre_parse</code>
<code>_curses</code>	<code>cgitb</code>	<code>macurl2path</code>	<code>ssl</code>
<code>_curses_panel</code>	<code>chardet</code>	<code>mailbox</code>	<code>stat</code>
<code>_datetime</code>	<code>chunk</code>	<code>mailcap</code>	<code>statistics</code>
<code>_dbm</code>	<code>cmath</code>	<code>marshal</code>	<code>string</code>
<code>_decimal</code>	<code>cmd</code>	<code>math</code>	<code>stringprep</code>
<code>_dummy_thread</code>	<code>code</code>	<code>mimetypes</code>	<code>struct</code>
<code>_elementtree</code>	<code>codecs</code>	<code>mmap</code>	<code>subprocess</code>
<code>_functools</code>	<code>codeop</code>	<code>modulefinder</code>	<code>sunau</code>
<code>_gdbm</code>	<code>collections</code>	<code>multiprocessing</code>	<code>symbol</code>
<code>_hashlib</code>	<code>colorama</code>	<code>netrc</code>	<code>symtable</code>
<code>_heapq</code>	<code>colorsys</code>	<code>nis</code>	<code>sys</code>
<code>_imp</code>	<code>compileall</code>	<code>nntplib</code>	<code>sysconfig</code>
<code>_io</code>	<code>concurrent</code>	<code>ntpath</code>	<code>syslog</code>
<code>_json</code>	<code>configparser</code>	<code>nturl2path</code>	<code>tabnanny</code>
<code>_locale</code>	<code>contextlib</code>	<code>numbers</code>	<code>tarfile</code>
<code>_lsprof</code>	<code>copy</code>	<code>opcode</code>	<code>telnetlib</code>
<code>_lzma</code>	<code>copyreg</code>	<code>operator</code>	<code>tempfile</code>
<code>_markupbase</code>	<code>crypt</code>	<code>optparse</code>	<code>termios</code>
<code>_md5</code>	<code>csv</code>	<code>os</code>	<code>test</code>
<code>_multibytecodec</code>	<code>ctypes</code>	<code>ossaudiodev</code>	<code>textwrap</code>
<code>_multiprocessing</code>	<code>curses</code>	<code>packaging</code>	<code>this</code>
<code>_opcode</code>	<code>datetime</code>	<code>parser</code>	<code>threading</code>
<code>_operator</code>	<code>dbm</code>	<code>pathlib</code>	<code>time</code>
<code>_osx_support</code>	<code>decimal</code>	<code>pdb</code>	<code>timeit</code>
<code>_pickle</code>	<code>difflib</code>	<code>pickle</code>	<code>token</code>
<code>_posixsubprocess</code>	<code>dis</code>	<code>pickletools</code>	<code>tokenize</code>

<code>_pydecimal</code>	<code>distlib</code>	<code>pip</code>	<code>trace</code>
<code>_pyio</code>	<code>distro</code>	<code>pipes</code>	<code>traceback</code>
<code>_random</code>	<code>distutils</code>	<code>pkg_resources</code>	<code>tracemalloc</code>
<code>_sha1</code>	<code>doctest</code>	<code>pkgutil</code>	<code>tty</code>
<code>_sha256</code>	<code>dummy_threading</code>	<code>platform</code>	<code>turtle</code>
<code>_sha3</code>	<code>easy_install</code>	<code>plistlib</code>	<code>types</code>
<code>_sha512</code>	<code>email</code>	<code>poplib</code>	<code>typing</code>
<code>_signal</code>	<code>encodings</code>	<code>posix</code>	<code>unicodedata</code>
<code>_sitebuiltins</code>	<code>ensurepip</code>	<code>posixpath</code>	<code>unittest</code>
<code>_socket</code>	<code>enum</code>	<code>pprint</code>	<code>urllib</code>
<code>_sqlite3</code>	<code>errno</code>	<code>profile</code>	<code>urllib3</code>
<code>_sre</code>	<code>faulthandler</code>	<code>pstats</code>	<code>uu</code>
<code>_ssl</code>	<code>fcntl</code>	<code>pty</code>	<code>uuid</code>
<code>_stat</code>	<code>filecmp</code>	<code>pwd</code>	<code>venv</code>
<code>_string</code>	<code>fileinput</code>	<code>py_compile</code>	<code>warnings</code>
<code>_strptime</code>	<code>fnmatch</code>	<code>pyclbr</code>	<code>wave</code>
<code>_struct</code>	<code>formatter</code>	<code>pydoc</code>	<code>weakref</code>
<code>_symtable</code>	<code>fractions</code>	<code>pydoc_data</code>	<code>webbrowser</code>
<code>_sysconfigdata_m_li</code>	<code>ftplib</code>	<code>pyexpat</code>	<code>webencodings</code>
<code>_testbuffer</code>	<code>functools</code>	<code>pyparsing</code>	<code>wsgiref</code>
<code>_testcapi</code>	<code>gc</code>	<code>queue</code>	<code>xdrlib</code>
<code>_testimportmultiple</code>	<code>genericpath</code>	<code>quopri</code>	<code>xml</code>
<code>_testmultiphase</code>	<code>getopt</code>	<code>random</code>	<code>xmlrpc</code>
<code>_thread</code>	<code>getpass</code>	<code>re</code>	<code>xxlimited</code>
<code>_threading_local</code>	<code>gettext</code>	<code>readline</code>	<code>xxsubtype</code>
<code>_tracemalloc</code>	<code>glob</code>	<code>reprlib</code>	<code>zipapp</code>
<code>_warnings</code>	<code>grp</code>	<code>resource</code>	<code>zipfile</code>
<code>_weakref</code>	<code>gzip</code>	<code>retrying</code>	<code>zipimport</code>
<code>_weakrefset</code>	<code>hashlib</code>	<code>rlcompleter</code>	<code>zlib</code>
<code>abc</code>	<code>heapq</code>	<code>runpy</code>	