Introduction to CodaLab Competitions





Tristan Miller

Presented at:

School of Data Analysis and Artificial Intelligence National Research University – Higher School of Economics 25 May 2017

Overview



What are shared tasks?

What is CodaLab Competitions?

Organizing CodaLab Competitions

Student competitions

Caveats



What are shared tasks?



In a shared task / challenge / competition / evaluation campaign / evaluation exercise, the organizers

▶ define a data processing **task** (classification, segmentation, ranking, etc.)



- ▶ define a data processing **task** (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance



- define a data processing task (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers



In a shared task / challenge / competition / evaluation campaign / evaluation exercise, the organizers

- define a data processing task (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers

solicit participants to write algorithms to process the test data



- ▶ define a data processing **task** (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers

- solicit participants to write algorithms to process the test data
- applying the evaluation metrics, score the algorithms' output against the gold standard



- define a data processing task (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers
 - produce trial data for demonstration purposes
 - produce or provide ancillary resources (knowledge bases, etc.)
 - produce training data for use by supervised algorithms
- solicit participants to write algorithms to process the test data
- applying the evaluation metrics, score the algorithms' output against the gold standard



- define a data processing task (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers
 - produce trial data for demonstration purposes
 - produce or provide ancillary resources (knowledge bases, etc.)
 - produce training data for use by supervised algorithms
- solicit participants to write algorithms to process the test data
 - implement various baseline algorithms
- applying the evaluation metrics, score the algorithms' output against the gold standard



- ▶ define a data processing **task** (classification, segmentation, ranking, etc.)
- define evaluation metrics to measure performance
- produce test data and the gold standard answers
 - produce trial data for demonstration purposes
 - produce or provide ancillary resources (knowledge bases, etc.)
 - produce training data for use by supervised algorithms
- solicit participants to write algorithms to process the test data
 - ▶ implement various baseline algorithms
- applying the evaluation metrics, score the algorithms' output against the gold standard
 - compare and analyze the participants' and baseline algorithms

Shared tasks: pros and cons



Pros:

- stimulate methodological research on unsolved problems
- provide standardized data sets, resources, and evaluation metrics
- facilitate reproducibility of research results
- centralize publication and discussion of research results

Shared tasks: pros and cons



Pros:

- stimulate methodological research on unsolved problems
- provide standardized data sets, resources, and evaluation metrics
- facilitate reproducibility of research results
- centralize publication and discussion of research results

Cons:

- everything must be planned in advance
- large organizational overhead (data distribution, publicity, communication with participants, etc.)
- encourages "teaching to the test"



What is CodaLab Competitions?

CodaLab Competitions



Calab

- Web-based platform for running online data-based competitions
- Developed by Microsoft, Stanford University, and others
- ► Free hosted implementation: https://competitions.codalab.org/
- ► Free software (Apache License 2.0): https://github.com/codalab/codalab-competitions/

Microsoft COCO Image Captioning Challenge





The man at bat readies to swing at the pitch while the umpire looks on.



A large bus sitting next to a very tall building.

ChaLearn Looking at People Challenges









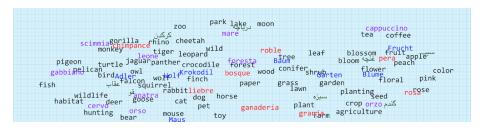






SemEval-2017 Multilingual and Cross-lingual Semantic Word Similarity





CodaLab features



- Hosts public task website
- Hosts private gold-standard data and scoring software
- Manages participant registration
- Enforces submission deadlines
- Runs scoring software
- Tabulates, stores, and publishes results
- ► Handles communication between organizers/participants (e-mail, forums)
- Provides some publicity

Sign Up



Accelerating reproducible computational research.

Popular Competitions



LiTS - Liver Tumor Segmentation Challenge



Microsoft COCO Image Captioning



Featured Competitions



Challearn LAP Real Versus Fake Expressed Emotion



MICCAI Multimodal Brain Tumor



The Large Scale Movie Description Challenge (LSMDC)

Codal ab Search Competitions My Competitions Help Sign Up Sign In



The Story Cloze Test

Organized by ROCNLP

A challenge for evaluating a system's natural language and story understanding.



The Large Scale Movie Description Challenge (LSMDC) 2016: Movie Multiple-Choice Test Organized by atousa

The goal of the challenge is to evaluate different visuallanguage models performance to annotate videos based on natural sentences for ...

18 participants



The Large Scale Movie Description Challenge (LSMDC) 2016: Movie Retrieval

Organized by atousa

The goal of the challenge is to evaluate different visuallanguage models performance to retrieve videos based on natural sentence queries ...



Competition for SemEval-2017/Task-11 Organized by julsal

End-User Development using Natural Language

About Forum Survey Privacy and Terms v0.1.1

CodaLab Search Competitions My Competitions Help Sign Up Sign In



SemEval-2017 Task 7, Subtask 3



Results Forums • D Overview Evaluation This is the CodaLab Competition for Subtask 3 of SemEval-2017 Task 7: Detection and A pun is a form of wordplay in which one signifier (e.q., a word or phrase) suggests two or more meanings by exploiting polysemy, or phonological similarity to another signifier, for an intended humorous or rhetorical effect. For example, the first of the following two punning jokes exploits contrasting meanings of the word "interest", while the second exploits the sound similarity between the surface form "propane" and the latent target "profane": I used to be a banker but I lost interest. When the church bought gas for their annual barbecue, proceeds went from the sacred to the propane.

CodaLab Search Competitions My Competitions Help Sign Up Sign In

Competition



SemEval-2017 Task 7, Subtask 3

Organized by Logological - Current server time: May 7, 2017, 2:11 p.m. UTC



Results Forums • 2 Evaluation criteria Evaluation The evaluation for this subtask will be carried out in two simultaneous phases, one for the homographic data set and one for the heterographic data set. Systems may participate in either or both phases. Systems participating in a given phase may provide single a guess for any or all of the contexts in the data set. The results for each phase must be submitted in a delimited text file named answer.txt. Each line of the text file consists of three fields separated by horizontal whitespace (a single tab or space character). The first field is the ID of a pun word from the data set. The second field is a semicolon-delimited list of WordNet 3.1 sense keys that match one meaning of the pun. The third field is a semicolon-delimited list of WordNet 3.1 sense keys that match the other meaning of the pun. Sample data and results files are available in the trial data. To submit the results, place answer.txt in a ZIP file (in the top-level directory), and then upload it to CodaLab according to the instructions at Participating in a Competition.

CodaLab

Search Competitions

My Competitions Help Sign Up Sign In



SemEval-2017 Task 7, Subtask 3

▶ Current Next Test (Homographic) Trial Dec. 5, 2016, midnight UTC Jan. 23, 2017, midnight UTC

Participate Results Forums Phases

Start: Dec. 5, 2016, midnight

Test (Homographic)

Start: Jan. 23, 2017, midnight

Test (Heterographic)

Start: Jan. 23, 2017, midnight

Jan. 30, 2017, 11:59 p.m.

Competition

Admin features



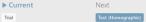
rticipants

ubmissions



SemEval-2017 Task 7, Subtask 3

Organized by Logological - Current server time: May 7, 2017, 2:14 p.m. UTC



arn the Details Phases Participate Results Forums

Dec. 5, 2016, midnight UTC

Get Data Data sets

Submit / View Results

Data sets for this subtask are described in detail on the SemEval-2017 Task 7 website.

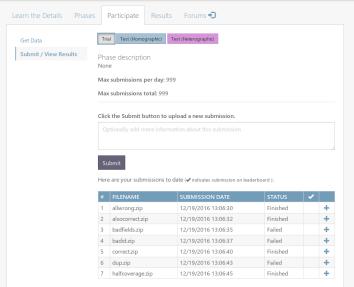
Jan. 23, 2017, midnight UTC

Download

· Trial and test data

Note that, due to the difficulty in amassing a large number of pun examples per word or per sense, there is **no training data** for this task.





My Competitions





SemEval-2017 Task 7, Subtask 3

Organized by Logological - Current server time: May 7, 2017, 2:14 p.m. UT

 ▶ Current
 Next

 Trial
 Test (Homographic)

 Dec. 5, 2016, midnight UTC
 Jan. 23, 2017, midnight UTC

earn the Detail

hases Participat

Results

Forums 👈

Trial Test (Homographic)

Test (Heterographic)

Phase description None

None

Max submissions per day: 999

Max submissions total: 2

Χ

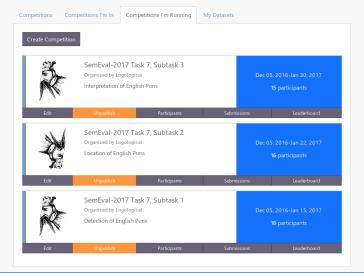
Download CSV Download all submissions on leaderboard

coverage 🔺 doogyb 0.0774 (4) 0.0770 (4) 0.0778 (4) 0.9900 (1) kevang BuzzSaw 0.1544 (2) 0.1563 (2) Ihurtado ELIRF-UPV 0.0996 (3) 0.9646 (3) UTMN 0.0452 (5) 0.0424 (5) 0.0484 (5) 0.8760 (4) evrog 0.1683 (1) 0.8606 (5) tpederse 0.1448 (2)



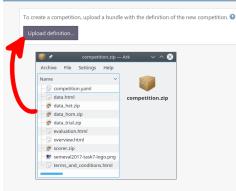
Organizing CodaLab Competitions

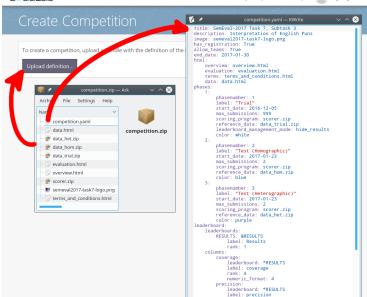
Competitions (My CodaLab)



CodaLab

To create a competition, upload a bundle with the definition of the new competition.





rank: 3

Competition bundle file structure



Competitions are defined by a zipped file archive (a bundle) containing:

- ▶ a logo image
- HTML files for the competition website
- scoring software (ZIP archive)
- gold-standard ("reference") data (ZIP archive)
- competition.yaml

competition.yaml settings



- Competition title, description, and logo
- Whether registration is required
- Filenames for standard and option web pages
- Configuration of competition phases
- Format of the leaderboard

competition.yaml: basic settings



```
title: SemEval-2017 Task 7, Subtask 3
description: Interpretation of English Puns
image: semeval2017-task7-logo.png
has_registration: True
allow_teams: True
end_date: 2017-01-30
html:
    overview: overview.html
    evaluation: evaluation.html
    terms: terms_and_conditions.html
    data: data.html
```

Competition

Admin features



rticipants

Submissions



SemEval-2017 Task 7, Subtask 3

Organized by Logological - Current server time: May 7, 2017, 2:14 p.m. UTC

► Current Next

Trial Test (Homographic

Dec. 5, 2016, midnight UTC Jan. 23, 2017, midnight UTC

earn the Details Pha

Submit / View Results

Participate

Results Forums •

Get Data

Data sets

Data sets for this subtask are described in detail on the SemEval-2017 Task 7 website.

Download

· Trial and test data

Note that, due to the difficulty in amassing a large number of pun examples per word or per sense, there is **no training data** for this task.

HTML files



```
Data sets for this subtask are described in detail on the
    <a href="http://alt.qcri.org/semeval2017/task7/index.php</pre>
   ?id=data-and-resources">SemEval-2017 Task 7 website</a>.<
   /p>
<h4>Download</h4>
<111>
 <a href="data/uploads/semeval2017_pun_task.tar.xz">
    Trial data</a>
 Test data will not be released until the evaluation
    begins
Note that, due to the difficulty in amassing a large
   number of pun examples per word or per sense, there is <
   strong>no training data</strong> for this task.
```

Competition phases



- Phases break your competition into optional subtasks
- Each phase has its own:
 - title
 - start date
 - scoring program
 - data
 - submission limit
- ▶ Phases can be run in parallel, staggered, or (with some difficulty) in sequence
- ▶ It's common to have a "trial" phase for sandbox testing:
 - earlier start date
 - toy data
 - unlimited submissions

competition.yaml: defining phases



```
phases:
    1:
        phasenumber: 1
        label: "Trial"
        start_date: 2016-12-05
        max_submissions: 999
        scoring_program: scorer.zip
        reference_data: data_trial.zip
        leaderboard_management_mode: hide_results
        color: white
    2:
        phasenumber: 2
        label: "Test, (Homographic)"
        start date: 2017-01-23
```

CodaLab

Search Competitions

My Competitions Help Sign Up Sign In



SemEval-2017 Task 7, Subtask 3

▶ Current Next Test (Homographic) Trial Dec. 5, 2016, midnight UTC Jan. 23, 2017, midnight UTC

Participate Results Forums Phases

Start: Dec. 5, 2016, midnight Test (Homographic)

Start: Jan. 23, 2017, midnight

Test (Heterographic)

Start: Jan. 23, 2017, midnight

Jan. 30, 2017, 11:59 p.m.

Leaderboards



- A leaderboard is a dynamically updated results table
- Each phase has 0 or more leaderboards, public or hidden
- The columns are the metrics output by your scoring software
- The rows are the participants' submissions
- You define the column labels and numeric format
- You can also rank the metrics by priority

competition.yaml: defining the leaderboards



```
leaderboard:
    leaderboards:
        RESULTS: & RESULTS
             label: Results
             rank: 1
    columns:
        coverage:
             leaderboard: *RESULTS
             label: coverage
             rank: 4
             numeric_format: 4
        precision:
             leaderboard: *RESULTS
             label: precision
```









Results

Forums •

Test (Homographic) Trial

Test (Heterographic)

Phase description None

Max submissions per day: 999

Max submissions total: 2

■ Download CSV Download all submissions on leaderboard

Results						
	User		F1 ▲	recall ▲	precision 🛦	coverage 🛦
1	doogyb		0.0774 (4)	0.0770 (4)	0.0778 (4)	0.9900 (1)
2	kevang	BuzzSaw	0.1544 (2)	0.1525 (1)	0.1563 (2)	0.9761 (2)
3	Ihurtado	ELIRF-UPV	0.0996 (3)	0.0978 (3)	0.1014 (3)	0.9646 (3)
4	evrog	UTMN	0.0452 (5)	0.0424 (5)	0.0484 (5)	0.8760 (4)
5	tpederse		0.1557 (1)	0.1448 (2)	0.1683 (1)	0.8606 (5)

Scoring programs and reference data



- ▶ You provide a ZIP file containing arbitrary gold-standard reference data
- You provide another ZIP file containing
 - an executable scorer
 - a metadata file that describes how to run the scorer, using the following variables:

```
$program scorer directory
$input/ref reference data directory
$input/res submission data directory
$output output directory
```

```
description: Scoring program for Subtask 3 of SemEval
  -2017 Task 7 (pun interpretation)
command: java -classpath $program de.tudarmstadt.ukp.
   semeval2017.task7.scorer.PunScorer -i $input/ref/
   truth.txt $input/res/answer.txt $output/scores.txt
```

Scoring programs and reference data



- Scorers can be written in any language (Python, Java, Perl, etc.)
- ► The scorer must produce a key-value file \$output/scores.txt
- Each key corresponds to a leaderboard column key:

```
coverage: 1.000 precision: 0.825 recall: 0.775 f1: 0.799
```

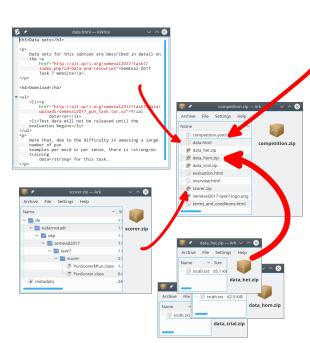
- stderr is captured and reported to the submitter
- stderr and stdout are captured and stored for the competition organizer



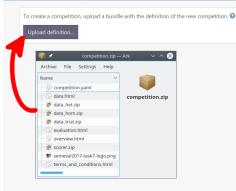




```
description: Interpretation of English Puns
image: semeval2017-task7-logo.png
has_registration: True
allow teams: True
end date: 2017-01-30
    overview: overview.html
    evaluation: evaluation.html
    terms: terms and conditions.html
    data: data.html
phases:
        phasenumber: 1
        label: "Trial"
        start date: 2016-12-05
        max submissions: 999
        scoring_program: scorer.zip
        reference data: data trial.zip
        leaderboard management mode: hide results
        color: white
        phasenumber: 2
        label: "Test (Homographic)"
        start date: 2017-01-23
        max submissions: 2
        scoring_program: scorer.zip
        reference data: data hom.zip
        color: blue
        phasenumber: 3
        label: "Test (Heterographic)"
        start date: 2017-01-23
        max submissions: 2
        scoring_program: scorer.zip
        reference_data: data_het.zip
        color: purple
leaderboard:
    leaderboards:
        RESULTS: ARESULTS
            label: Results
            rank: 1
    columns:
        coverage
            leaderboard: *RESULTS
            label: coverage
            rank: 4
            numeric_format: 4
        precision:
            leaderboard: *RESULTS
            label: precision
            rank: 3
```



```
description: Interpretation of English Puns
image: semeval2017-task7-logo.png
has_registration: True
allow teams: True
end date: 2017-01-30
    overview: overview.html
    evaluation: evaluation.html
    terms: terms and conditions.html
    data: data.html
phases:
        phasenumber: 1
        label: "Trial"
        start date: 2016-12-05
        max_submissions: 999
        scoring_program: scorer.zip
        reference data: data trial.zip
        leaderboard management mode: hide results
        color: white
        phasenumber: 2
        label: "Test (Homographic)"
        start date: 2017-01-23
        max submissions: 2
        scoring_program: scorer.zip
        reference data: data hom.zip
        color: blue
        phasenumber: 3
        label: "Test (Heterographic)"
        start date: 2017-01-23
        max submissions: 2
        scoring_program: scorer.zip
        reference_data: data_het.zip
        color: purple
leaderboard:
        RESULTS: ARESULTS
            label: Results
            rank: 1
    columns:
        coverage
            leaderboard: *RESULTS
            label: coverage
            rank: 4
            numeric_format: 4
        precision:
            leaderboard: *RESULTS
            label: precision
            rank: 3
```

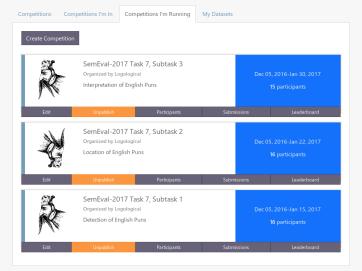


Upon uploading a competition



- You will (usually) be warned if there is a problem
- You optionally "publish" your competition:
 - Unpublished: accessible only if you know the URL (default)Published: listed on CodaLab Competitions home page
- Competitions can be edited via the web interface to:
 - Publish/unpublish
 - Change competition settings
 - Edit web pages (via rich text editor)
 - Add or remove reference data and scoring programs
- Editing the original YAML is no longer possible!

Competitions (My CodaLab)



Download original YAML file	② Help
General Information	
Title:	SemEval-2017 Task 7, Subtask 3
Description:	Interpretation of English Puns
	Disallow leaderboard modifying
	☐ Force submission to leaderboard
Logo:	Currently: logos/semeval2017-task7-logo_33.png
	Change: Browse No file selected.
	✓ Registration Required
End Date (UTC):	2017-01-30 23:59:59
	☐ Enable medical image viewer
	Enable detailed results

Competitions (My Datasets

Competitions

omnetitions I'm In

Competitions I'm Runnin

My Datasets

Create Dataset					
		DESCRIPTION			MULTI- DELETE? (UNSAFEI)
scorer_1_15705	66628265-3f45-4a9f- bb08-ca21ed02b33b	None	Scoring Program	Download Delete	
data_trial_1_15705	ced44e66-4c5c-4a40-86ad- e35bc6385d4b	None	Reference Data	Download Delete	
scorer_1_15706	fc3a8853-0490-47c8- b3f4-9cb82c7e40b4	None	Scoring Program	Download Delete	
data_trial_1_15706	d81e2ebf-e875-431d- 8c16-281670513146	None	Reference Data	Download Delete	
scorer_1_15707	96adea9b-0957-4e00-84ff- 8cddb01ec5fd	None	Scoring Program	Download Delete	
data_trial_1_15707	6159a63c- e180-40b8-9ec7-6594a0482b97	None	Reference Data	Download Delete	
scoring_program_1_15847	ae8efe2a-d979-444a- bdf3-7316b9d6ba9d	None	Scoring Program	Download Delete	
dev_data_1_15847	d8277bc8-3660-4329- ad47-f09fe610c5bb	None	Reference Data	Download Delete	
test_data_2_15847	a666e75d-869d-4dde- bfe1-4fb727c85dde	None	Reference Data	Download Delete	
SemEval 2017 Task 7 Subtask 1 Homographic	bf68f74d-02c1-4682- b1ce-33894c1b5082		Reference Data	Download Delete	
SemFyal 2017 Task 7	eb0c1b99-cf6f-4171-		Reference	Doumload Dalata	

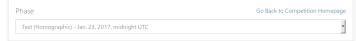
Viewing and downloading submissions



The "Submissions" page allows you to:

- see a list of all successful and failed submissions
- download the original system output
- download a CSV of all system scores
- re-run the scorer on one or all submissions
- delete a submission
- (un)hide a submission from the leaderboard

Submissions



View all submission's metadata

Select phase description

None

Max submissions per day: 999

Max submissions total: 2

Submissions

Download CSV Re-run all submissions in this phase

1 Jan. 25, 2017, kevang 385636 WSDse_splitzip Finished True 0.9761 + DEL HIDE 5.41 p.m. 2 Jan. 27, 2017, evrog 385621 homs_3.zip Finished True 0.8760 + DEL HIDE 1.01 p.m. 3 Jan. 27, 2017, lhurtado 385895 answer.bt_task7.3.zip Failed False None + DEL SHOW Jan. 27, 2017, m. Jan. 27,	FAILED RE-RUN
2 3.34 a.m. evrog 385821 noms_3.2ip Finished True 0.8760 + DEL FIDE 3 Jan. 27, 2017, Ihurtado 385895 answer.brt_task7.3.zip Failed False None + DEL SHOW 1 p. 27, 2017	
7 p.m. Inurrado 365695 answer.txt_task/_3zip Failed Faise None T DEL SHOW	FAILED RE-RUN
lan 27 2017	FAILED RE-RUN
4 7:10 p.m. Ihurtado 385897 answer.txt_task7.3.zip Finished True 0.9646 + DEL HIDE	FAILED RE-RUN
5 Jan. 28, 2017, evrog 385931 homs_3_extended.zip Failed False None 🕂 DEL SHOW	FAILED RE-RUN
6 Jan. 28, 2017, 420 a.m evrog 385932 homs_3_extended.zip Finished False None + DEL SHOW About Forum Survey	FAILED RE-RUN Privacy and Terms v0



Search this site

universite Projet M2 & L2 AIC 2016/2017

Mini Challenges 2017



Challenges (M2 students)	Abstract	Task	Solution (Video L2 students)
Blue	Activity of molecules against HIV The problem is to relate molecular structure to activity to screen new compounds before actually testing them with High Throughput Screening (HTS) in vitro experiments. HTS is a method for massive scientific experimentation used in drug discovery, linking the fields of biology and chemistry. This method remains very costly process despite many recent technological advances in the field of biotechnology. This is why applying machine learning methods would be of great benefit for the pharmaceutical industry to reduce the number of compounds that need to be tested.	The Objective of is to predict which compounds are active against the AIDS HIV infection. The dataset has two classes: active or inactive (Ginary Classification). The variables represent properties of the molecule inferred from its structure. Note: this project is running on the AIDS server. In case of problem, a previous version on the main Codalab instance is available.	Marine Cobalt
YOU SHALL NOT PASS	Lothiorien This challenge aims at addressing the issue of resources access (website, drug purchase, violent movie, etc.) based not he age of a person. Indeed a lot of violent content is accessible on the internet and 4.8% so f children under 12 are not monitored by parental control. For this sale, we rely on the person's	A computer vision challenge is proposed for undergraduate students in which the challenger must predict the class of a person (major or minor) based on a picture of his/her face. Note: the main Codalab instance of this challenge has been tested. Note: this project is running on the LRI server. In case of problem,	<u>Cerulean</u> <u>Turquoise</u>



- skill development for student participants/organizers
 - experimentation, problem formulation/solving
 - writing/fulfilling technical specifications
 - collaboration with peers
 - presentation of research results



- skill development for student participants/organizers
 - experimentation, problem formulation/solving
 - writing/fulfilling technical specifications
 - collaboration with peers
 - presentation of research results
- benefits for student participants
 - unrestricted choice of tools/methods
 - instant feedback to students
 - freedom to experiment



- skill development for student participants/organizers
 - experimentation, problem formulation/solving
 - writing/fulfilling technical specifications
 - collaboration with peers
 - presentation of research results
- benefits for student participants
 - unrestricted choice of tools/methods
 - instant feedback to students
 - freedom to experiment
- benefits for teachers
 - automatic enforcement of submission deadlines
 - instant tabulation of scores
 - consistent packaging of submissions



Caveats

Caveats



CodaLab Competitions is ...

- underdocumented
- unpredictable
- unintuitive
- unstable

Caveats



CodaLab Competitions is ...

- underdocumented
- unpredictable
- unintuitive
- unstable

But it's ...

- free (as in beer)
- free (as in speech)
- popular
- under active development
- probably a time-saver, in the long run

Thank you!



Questions?