Homeworks

HW2 in:
Email us if you don’t want your assignment on a CS260 Youtube playlist.

HW3 out:
Write a synchronous, remote drawing application
2 weeks, as before
HW3 requirements

At least $n=2$ clients, shared state
Show a ghost cursor
Draw, erase, clear; change brush attributes
Share images (local or URL)
History replay
HW3 Demo

hw3server, hw3draw.app

right hand nav bar

should maybe move to the left?
HW 3 Ingredients

Network Communication
Drawing Command Language
UI Widgets
History
Optional HW

Post project ideas on the Wiki by this Friday.
Crowdsourcing
### A spectrum of collaboration

(not exhaustive)

<table>
<thead>
<tr>
<th>Number of Users</th>
<th>1</th>
<th>10</th>
<th>100</th>
<th>1k</th>
<th>10k</th>
<th>100k</th>
<th>1M</th>
<th>10M</th>
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</thead>
<tbody>
<tr>
<td>Identity of Users</td>
<td>Small group</td>
<td>Organization</td>
<td>Strangers</td>
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<td></td>
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<tr>
<td>Purpose</td>
<td>Work</td>
<td>Hobby</td>
<td>Family</td>
<td>Entertainment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time scale</td>
<td>Minutes</td>
<td>Hours</td>
<td>Days</td>
<td>Years</td>
<td>Open-Ended</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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## A spectrum of collaboration

(not exhaustive)

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<td></td>
<td></td>
<td></td>
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</table>

Social Computing
If you guess the right number of jellybeans, you may win a prize.

http://www.flickr.com/photos/jlmiller/35599670
Requirements for “Wise” Crowds

Diversity of Opinion
Independence
Decentralization
Aggregation
When computers were human...
NASA Clickworkers (2000)
Search for Steve Fossett (2007)

Steve Fossett Missing: Help find him by searching satellite imagery

New examples and instructions! If this is your first time working on this task, please carefully review the instructions further down.

Review This Image

Example

Example plane crash site

Need More Detail?

To view in Google Earth, load the KML file below then cut and paste:

38.290787,-118.732681

in the "Fly To" box found at the top left corner of the application.

For a similar viewing experience in Google Earth to the above image, navigate to an altitude of roughly 1,500 feet.

IMPORTANT: Please ensure that you've loaded the following KML file below in Google Earth before navigating to the co-ordinates. Otherwise, you risk looking at old and irrelevant images.

KML file for Google Earth Searching:

(c) This imagery is copyright GeoEye
Example of an airplane and an airplane crash showing the size of object being searched for.
Der Schachspieler im Spiele begriffen. Le Joueur d'Echecs tel qu'on le voit pendant le jeu.
### All HITs

#### 1-10 of 1677 Results

<table>
<thead>
<tr>
<th>Requester</th>
<th>HIT Expiration Date:</th>
<th>Reward:</th>
<th>HITs Available:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolores Labs</td>
<td>Jan 31, 2011 (6 days 23 hours)</td>
<td>$0.02</td>
<td>9763</td>
</tr>
<tr>
<td></td>
<td>Time Allocated:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscar Smith</td>
<td>Jan 24, 2011 (1 hour 59 minutes)</td>
<td>$0.02</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Time Allocated:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscar Smith</td>
<td>Jan 24, 2011 (1 hour 59 minutes)</td>
<td>$0.02</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Time Allocated:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nimrod shoam</td>
<td>Jan 27, 2011 (2 days 23 hours)</td>
<td>$0.10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Time Allocated:</td>
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</tr>
<tr>
<td></td>
<td>60 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andy Guy</td>
<td>Feb 3, 2011 (1 week 2 days)</td>
<td>$2.10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Time Allocated:</td>
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<tr>
<td></td>
<td>1 hour 52 minutes</td>
<td></td>
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<tr>
<td>techlist</td>
<td>Jan 24, 2011 (2 hours 45 minutes)</td>
<td>$0.01</td>
<td></td>
</tr>
</tbody>
</table>
Integrate Human Intelligence Into Your Software
Fast, accurate, and painless crowdsourcing

Use MobileWorks to...
- Read handwriting
- Classify data
- Tag images
- Transcribe audio
- Translate languages
- Verify business listings
- Proofread articles
- ...and more!

Build Your Own Crowd App
Learn more »

Try out applications that use the MobileWorks crowd

**Excavator**
Send teams of humans to collect email addresses, generate leads, or scrape data from the web.

[Try it now!]

**Digitizer**
Make paper forms a thing of the past. Use the power of the crowd to transform handwritten forms into Excel spreadsheets.

[Try it now!]
Typical tasks

- image labeling
- comment spam detection
- business listing verification
- human OCR
Business Cards Solved

step 1
point & capture

step 2
real people

GET STARTED

To Do
TRANSCRIBE CARDS!!

Simple

Accurate

Reliable
CashAudit Event Report For Store #2438

CashAudit Alert!

Date/Time: July 18, 2010 at 11:44 PM
ALERT: Cash On Counter (Code 3)

View Video

Date/Time: July 18, 2010 at 11:46 PM
ALERT: Cash Not Put In POS (Code 4)

View Video

This email automatically generated by ReTel Technologies and sent to mgr_2438@_______________.com

To change your email settings and distribution lists, please click here.
most of their images

other's images, Pixazza
product experts through
tagging service, any

tagging functionality.
you send
samasource a
project

work is allocated to
our service partners

women, youth, and
refugees complete
work

your project gets
delivered and helps
reduce poverty

samasource
breaks it down
into microwork

samasource
compiles work and
assures quality

samasource.org
### What's the craziest thing your cat has ever done?

<table>
<thead>
<tr>
<th>Requester:</th>
<th>Bjoern Hartmann</th>
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</thead>
<tbody>
<tr>
<td>HIT Expiration Date:</td>
<td>Jul 27 2008, 07:33 AM PDT</td>
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<tr>
<td>Reviewed Assignments:</td>
<td>30</td>
</tr>
<tr>
<td>Remaining Assignments:</td>
<td>0</td>
</tr>
<tr>
<td>Remaining Time:</td>
<td>Expired</td>
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### Sketch a cat

<table>
<thead>
<tr>
<th>Requester:</th>
<th>Bjoern Hartmann</th>
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<tbody>
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<td>Assignments Pending Review:</td>
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<td>Remaining Assignments:</td>
<td>0</td>
</tr>
<tr>
<td>Remaining Time:</td>
<td>Expired</td>
</tr>
</tbody>
</table>
Amazing but True Cat Stories

by Folks on the Internet
My cat has only one eye and he can open anything. He is a master at undoing the lid to his cat food container. Anything that screws on or latches he can get open. I have tried every kind of container and within 1 day he has it figured out. He can open any door. He loves to open the refrigerator and let the dog eat all she wants. He has even opened the front door for a visitor and they were shocked when the door opened and he was the only one sitting there. He can open the sliding door and any cabinet he feels the need to open.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Votes</th>
<th>Answers</th>
<th>Views</th>
<th>Title</th>
<th>Tags</th>
<th>Score</th>
<th>Time Ago</th>
<th>Username</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>2</td>
<td>26</td>
<td>Help with Javascript to C# converter</td>
<td>c# javascript converter</td>
<td></td>
<td>13m ago</td>
<td>griege</td>
<td>6,893</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>6</td>
<td>76</td>
<td>How to comment/uncomment in HTML code</td>
<td>html coding-style coding comment</td>
<td></td>
<td>19m ago</td>
<td>Jeff Knecht</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>45</td>
<td>Contents of a static library</td>
<td>c++ c library gcc</td>
<td></td>
<td>40m ago</td>
<td>Jonathan Leffler</td>
<td>61.3k</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>2</td>
<td>24</td>
<td>Most Efficient way to 'look up' Keywords</td>
<td>c++ search efficiency lexer</td>
<td></td>
<td>2m ago</td>
<td>ergosys</td>
<td>3,567</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td>unknown css effects in moz and webkit</td>
<td>css webkit effects tips-and-tricks mozila</td>
<td></td>
<td>2m ago</td>
<td>Pandiya Chendur</td>
<td>6,317</td>
</tr>
</tbody>
</table>
Craft Brewery Start-up Needs Your Help!!

Entries most recent first

99designs.com
The Dark Side of Crowdsourcing

Surveillance

Alienation & Deskilling

Moral Valence

Race to the Bottom

We should be careful to create a world we actually want to live in. (Stu Card)
Iranian protesters appearing in widely disseminated online photos from the ongoing post-election demonstrations in Iran, are now being targeted on a website of the Islamic Revolutionary Guard Corps.

The website [...] shows images of 20 people with red circles drawn around their faces claiming without evidence that they have been involved in creating “chaos” in Tehran.

Citizens are invited to call or email if they can identify the people on the photos. Gerdab also claims that two of the people depicted have already been arrested. The site provides no further information about any of the depicted people.

globalvoices.org
Actual Sighting Videos - BorderWatchSM Archives

Access to Texas Denied  Drugs Seized  Access to Texas Denied  Access to Texas Denied

Virtual Stake Outs - Live Border Cameras

**Camera 1**
This is a known drug traffic area. If you see people crossing from the left to right over these tracks please report this activity.

**Camera 2**
This area is known of illegal drug activity. If you see people moving in this area please report activity.

**Camera 3**
This area is a high crime area. If you see suspicious activity in this area please report. When focused on the river, please report subjects crossing via raft or swimming. If focused on land, look for subjects on foot moving towards right and may approach a vehicle parked along this area please report it immediately.

**Camera 4**
If you see people along river and or subjects in the water please report this activity. If camera focused on land, you are looking for individuals in the thick brush area.
Tradeoffs

Free or paid?
Friends, community or strangers?
Anyone (worldwide) or experts only?
Work product open or closed?
Simple or complex tasks?
Boundaries

New forms of (information) production:
- Micro-task markets
- Friendsourcing
- Online social participation
- Winner-takes-all competitions

Which of these are crowdsourcing?
Uses of MTurk-like systems in CS

Participant pool for user studies, experiments
Source of annotations for computer vision and NLP
HCl: worker pools hardwired into UIs
Research in crowd programming models, systems
Task markets as subjects of study: Economics, demographics
As a driver of international development
Mobile service that aids blind users with “visual questions” in near-realtime

http://www.cs.rochester.edu/u/jbigham/vizwiz/video/
VizWiz: Nearly Realtime Answers to Visual Questions
“Double-tap to take a photo.”

“Double-tap to begin recording your question and again to stop.”

“The first answer is ‘The right side,’ the second answer is …”

“Which can is the corn?”

Local Client
Remote Services and Worker Interface

Server

Database -
Web Server -
Speech Recognition -

quikTurkit
Humans Helping Robots See

Alex Sorokin, Willow Garage

http://www.youtube.com/watch?v=M0c3OMNYjWM
ideas = []
for (var i = 0; i < 5; i++) {
    idea = mturk.prompt(
        "What’s fun to see in New York City?
        Ideas so far: " + ideas.join("", ")
    )
    ideas.push(idea)
}

ideas.sort(function (a, b) {
    v = mturk.vote("Which is better?", [a, b])
    return v == a ? -1 : 1
})
TurKit - Crash and Rerun

Assumption: local computation is cheap & fast; Mturk calls are expensive & slow

Memoize Mturk call results across executions

Crash script on any long-latency Mturk call that has not yet completed; automatically or manually rerun

Benefits:
iterative programming
retroactive print-line debugging
• Please transcribe as many words as you can.
• Put a * in front of words you are unsure about.

TV is supposed to be bad for you, but I just love watching some TV shows. I think some TV shows are really entertaining, and I think it is good to be entertained.
How can we push *paid* crowdsourcing toward complex/expert work?

**Current Approaches:**

Design workflows that split tasks into pieces.  
*Engineering-heavy; building a house of cards?*

Design vertical sites for users with the right expertise.  
*Uncertain; dependent on finding right incentives; less elastic; requires lots of community “gardening”*
Two Ideas

1. Turkomatic: Let the crowd and requesters collaborate on designing and solving workflows.

2. Communitysourcing: Bring your work to existing expert crowds. Physically.
Turkomatic
Recursive Workflow Design & Management

work with
Anand Kulkarni, Matthew Can
Create a new blog about Mechanical Turk with at least two posts.
Workflows can be created recursively.

**Ask:** Can this HIT be solved\[in n min | for m $]\?  

**If yes:** Solve HIT.  
**Else:** Split HIT into multiple steps.  
For each step: Recurse.  
Merge steps into solution.
Break down the task written in red.

Instructions: We are dividing a large task among several workers on Mechanical Turk. This is an experiment to see how complicated tasks can be shared between multiple workers on Mechanical Turk. Your job is to help us plan how this work should be divided.

Here is the task you are asked to divide:

Write a 3-paragraph essay about crowdsourcing

Do not solve this task yourself. Please break the task down into 2 or more simpler steps. Write each step in a box below. You can add more steps.

Each step you suggest will be posted to Mechanical Turk again for another Turker to do. Make sure each step will make sense to another Turker.

Here is what makes a good answer:

- Every step is a complete sentence or set of instructions.
- Each step contains all information required to do the task.
- Every step explains clearly what a Turker should do.
- Each step can be understood by itself without reading the original task written in red.

Tips:

- You can ask Turkers to host images and pictures on other sites, like http://imgur.com or http://youtube.com.

Your work will be checked for correctness before being approved.

Step 1

[ ]

Step 2

[ ]
Solve a simple task

Instructions: We are dividing a large task among several workers on Mechanical Turk. This is an experiment to see how to break down large tasks. You are asked to do a small part of a large task that was planned by other workers.

The overall task: Write a 3-paragraph essay about crowdsourcing

Your task:

Visit online databases and libraries to find academic articles about crowdsourcing.

Your instructions: Please do this task and enter the solution in the box at the bottom of this page. You are free to include links to other images or videos you have uploaded online. If the instructions do not make sense, please take a look at the overall plan below and take your best guess.

Optional: click here to email us feedback about this HIT.

Here is the plan made by other workers:

- The overall task: Write a 3-paragraph essay about crowdsourcing
  - Step 1. Visit online databases and libraries to find academic articles about crowdsourcing. (this is your step)
  - Step 2. Read the articles and consider what three points you can develop about crowd surfing.
  - Step 3. Read the articles and highlight the data you can use.
Vote on the work of other Turkers

We gave several Turkers the following task and asked them to break it down into a set of smaller tasks:

Write a 3-paragraph essay about crowdsourcing

They gave the following breakdowns:

Turker 1:

Step 1: Visit online databases and libraries to find academic articles about crowdsourcing.

Step 2: Read the articles and consider what three points you can develop about crowd surfing.

Step 3: Read the articles and highlight the data you can use.

Turker 3:

Step 1: Write a 3-paragraph essay

Step 2: write about crowdsourcing

Choose the best breakdown for the task from among the ones given.
Specifically, use this criteria:

- Is every step a complete sentence or set of instructions?
- Does every step explain clearly what a Turker should do?
- Can you understand what each step is asking you to do without reading the original task in blue?

○ Turker 1
○ Turker 2
○ Turker 3

Some content omitted
Your goal is to find a solution to the following task highlighted in orange by combining the answers of other Turkers:

Write a 3-paragraph essay about crowdsourcing

Other Turkers have suggested that this task can be broken into the steps written in green below. These steps have already been solved by other Turkers. Their solutions are written below.

Please combine the solutions written below into a single solution to the task written in orange. You should modify the solutions as necessary to better solve the task written in orange.

Sub-task 1: Visit online databases and libraries to find academic articles about crowdsourcing.
Solution to sub-task 1: Crowdsourcing has endless possibilities especially in the hands of creators, inventors and the curious public. So far in the past, Makerbot has invited members of the 3D printing community to

Please enter your solution to the task in the box below.
Runtime Management

Weakest link problem: Even a single bad answer can break a workflow.

Answer: Give requesters tools to visualize and edit work.

Scaling: In the future, recruit workers into management roles.
Task: Create a list of the names of the Department Chairs for the schools whose rank is 1 to 5. For each school in rank 1 to 5, you should find the name of the Department Chair of the Computer Science Department for that school. Do not simply copy down the school names.

Status: solve

Solution:
1. W. Eric L. Grimson
2. Jennifer Widom
3. Costas Spanos
4. Jeannette M. Wing
5. Rob A. Rutenbar
Editing task 253 of job 42

Instructions:

Create a list of the names of the Department Chairs for the schools whose rank is 1 to 5. For each school in rank 1 to 5, you should find the name of the Department Chair of the Computer Science Department for that school. Do not simply copy the names of the chairs.

Solution Strategy:

- Let Workers Decide
- Solve Task
- Split Task

Solution: Will be recomputed based on your edit.

Write to Bjoern to ask for more tools here, or write your own.
Communitiesourcing
with Physical Kiosks

joint work with
Kurtis Heimerl, Kuang Chen, Brian Gawalt,
Tapan Parikh, Eric Brewer
Q: Where are the experts?
A: Not online.
Can we crowdsourcsource expert tasks by motivating groups of local experts?
Q: What’s the most tedious task you have to perform as a teacher?
Problem 1. (7 points) Quickies.

a. (1 point) Briefly explain the difference between an instance variable and a class variable.

b. (1 point) Can you use the super keyword in a static method? Explain.

c. (3 points) What is the output of this program? Explain why.

```java
public class What {
    public long n;

    public void increment() {
        n++;
    }

    public static void reset(What w) {
        w.increment();
        w = new What();
        w.n = 0;
    }

    public static void main(String[] args) {
        What w = new What();
        w.n = 7;
        reset(w);
        System.out.println("The number is " + w.n);
    }
}
```

d. (2 points) What’s wrong with the following code? Specifically, what does this code do? (Yes, it does compile and run.)

```java
public class Soda {
    public String name;

    public Soda() {
        Soda pop = new Soda();
    }
}
```
How about peer grading?
The following program compiles. What does the main program (in D) print?

class A {
    int z = 2;
    void f () { this.g (); }
    void g () { System.out.printf (A: %d%n; z); }
    int h () { return z; }
}

class B extends A {
    int z = 15;
    void g () { System.out.printf (h: %d z: %d%n; h(), z); }
}

class C extends A {
    int z = 42;
    void g () { this.g (); }
}

A: 2
A: 2
h: 2 z: 15
h: 2 z: 15
<table>
<thead>
<tr>
<th>Question</th>
<th>Professor</th>
<th>Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the result of compiling and executing the following? Briefly explain your answer.</td>
<td>The cast (A) b causes a run-time exception, because the type of b is not a subtype of A, even though it implements exactly the same methods.</td>
<td></td>
</tr>
</tbody>
</table>

*Instructions*

Your task is to grade these exam questions. You can zoom in by double-tapping and remove fields from view by selecting the button on the top.
What is the result of compiling and executing the following? Briefly explain your answer.

```
abstract class A {
    abstract void f();
}

class B {
    void f() { println("Hello, world!"); }
}

public class Main {
    public static void main(String[] args) {
        Object b = new B();
        b.f();
    }
}
```

The cast (A) b causes a runtime exception, because the type of b is not a subtype of A, even though it implements exactly the same methods.

```
error because no g method defined
(g((A)B) gives an error)
```
1 Week
300+ Unique Users
7500+ Answers Graded
$200 of Candy
How Good are the Answers?

Gold Standard:
10 Expert Graders (TAs, CS PhD students)

Sanity Check:
Mechanical Turk (w/ and w/o qualification)
Worse than chance (20%)
11 Umatiers are better than 1 expert!

More Turkers = more noise
UpShot

Physical kiosks with physical rewards can entice local crowds to do useful work.

30% cheaper and more accurate than a hiring experts (PhD students).
LET THERE BE LIGHT

cs260@imail.eecs.berkeley.edu
hci.berkeley.edu/cs260