CMPS 10 Final Review Section

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General Guidelines

- Covers the material not covered on the midterm
- Not cumulative
- All multiple choice. Bring a SCANTRON
- Should be just a little longer than the midterm
- At officially scheduled time next Wed at 4pm.
Binary Conversion & Addition

- Convert base 10 to base 2
  - eg. Convert 230 base 10 to base 2
- Convert base 2 to base 10
  - eg. Convert 110110 base 2 to base 10
- Binary addition
  - eg. 0110101 + 1011001
White-Grey-Black

- White-Grey-Black all have same values for RGB
  - Black = [0, 0, 0] 0000 0000 0000 0000 0000 0000
  - Grey = [128, 128, 128] 1000 0000 1000 0000 1000 0000
  - White = [255, 255, 255] 1111 1111 1111 1111 1111 1111

- Special binary values
  - eg. 255=256-1
Steganography (Putting images inside other images)

- Step 1: Reduce Bits of Guest
  - We don’t need all of the bits in RGB to get a decent picture
Steganography (Putting images inside other images)

- Step 2: Replace Bits In Host
  - (Put guest bits into right 2 bits of host)
Processing

- `random(low, high);`

- **Concepts**
  - Variables and Declarations
  - Assignments
  - Expressions
  - Repetition (looping) or for-statements
  - Tests or if-statements
  - Functions
Functions

- HW10: Functions
- Functions in Processing:
  - return type
  - function name
  - parameters
  - function body
- Function definition (parameters) and function call (arguments)
- Function inside function
HTML (Hyper-Text Markup Language)

• Basic rules for HTML
  ◦ Content is given directly; anything that is not content is given inside of tags
  ◦ Tags must be paired or “self terminated”

• Put an image
  <img src="cooking-ewan-isabel.jpg" alt="Kids Cooking"/>

• Put a link
  <a href=http://users.soe.ucsc.edu/~maw>Prof. Walker’s</a>

• Directory structure
  <img src="images/cooking-ewan-isabel.jpg" alt="Kids Cooking"/>
XML & XSL

- XML (Extensible Markup Language): data
  - Self-defining tags, start tag `<mynewtag>` and End tag `</mynewtag>`

- XSL (Extensible Stylesheet Language): processing of the data (search, display, etc.)
  - Include the `.xsl` in `.xml` file to display the content of the `.xml` file
Some recent fun trips

This is my page about some recent family trips

2008
Orangatan Reserve. Borneo

I got invited to give a talk at a workshop in Singapore, and we all went and popped over to Borneo before the workshop and went to an Orangutan Reserve. On the last morning we saw a mom and baby in the wild. You can kind of see it here. Borneo is the most interesting place I've ever been.

2010
Kyoto Japan

I got invited to give the keynote at SIGDIAL 2010 in Tokyo and we all went and visited Kyoto and the Holy mountain Koya-San. We stayed at a Buddhist temple and feasted on umeboshi.
# My Trip List

<table>
<thead>
<tr>
<th>Year</th>
<th>Place</th>
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</tr>
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<tbody>
<tr>
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<td>2011</td>
<td>Roatan Honduras</td>
<td>My kids hadn't been snorkeling since they were about 5. We heard Roatan was good and went for a week last year. Rays! Turtles!</td>
</tr>
</tbody>
</table>

```xml-stylesheet · type="text/xsl" · href="mytravel-v2.xsl"```
Algorithms

- Five properties characterize algorithms
  - **Input specified** – tell form and amount of input required
  - **Output specified** – tell form and amount of output produced
  - **Definiteness** – say explicitly what to do & in what order
  - **Effectiveness** – operations within agent’s abilities
  - **Finiteness** – will stop and give an answer or say “none”

- Computability: n is the size of input dataset
  - Linear -> time proportional to n
  - Polynomial time -> time proportional to \( n^2 \)
    - Bubble sort: \( O(n^2) \)
    - Quick sort: average case: \( O(n \log n) \); worst case: \( O(n^2) \)
  - **NP-complete (Non-Polynomial)**
    - Travelling salesman problem
Web Search

- **Web Search** *(look into each step carefully)*
  - Gather information.
  - Keep copies.
  - Build an index.
  - Understand the query.
  - Determine the relevance of each possible result to the query.
  - Determine the ranking of the relevant results.
  - Present the results.

- Page Rank Algorithms: factors considered
Web Search

- Google: query algorithm, advanced search...
- Algorithm for processing a Google query:

1. Parse the query.
2. Convert words into wordIDs.
3. Seek to the start of the doclist in the short barrel for every word.
4. Scan through the doclists until there is a document that matches all the search terms.
5. Compute the rank of that document for the query.
6. If we are in the short barrels and at the end of any doclist, seek to the start of the doclist in the full barrel for every word and go to step 4.
7. If we are not at the end of any doclist go to step 4.
8. Sort the documents that have matched by rank and return the top k.

Figure 4. Google Query Evaluation
AI: Watson in Jeopardy

- Natural Language Processing Technology
- Question Answering (QA)
  - Determine the semantic type of the expected answer
  - Retrieve documents that have keywords from the question
  - Look for named-entities of the proper type near keywords
- Potential Business Applications
Prof. Kurniawan’s Guest Lecture

- Human Computer Interaction and Design for Special Populations:
  - Edutainment software for children with ASD and ADHD
  - Non-verbal vocal input
  - Game for Preparing Birth Partners
April & Grace’s Guest Lecture

• April – Game design
  ◦ game pitching, team-building, prototyping…
  ◦ Coding is not a very big part

• Grace - Research in Intelligent Narrative Technologies and Interactive Stories
  ◦ 1. Collect movie scripts from IMSDb
  ◦ 2. Extract utterances for each character
  ◦ 3. Select leading roles (dialogue > 60 turns)
  ◦ 4. Generate features reflecting linguistic behaviors
  ◦ 5. Learn models of character
  ◦ 6. Generate new utterances using learned models to control parameters of our dialogue generator
Prof. Luca De Alfaro’s Guest Lecture

- Choosing CS as a career
- Online reputation systems
  - Wikipedia
  - Google
  - Youtube
  - Scientific Publications