

# **CS 553:** **Cloud Computing**

## **Syllabus**

**Ioan Raicu**  
Computer Science Department  
Illinois Institute of Technology

**CS 553: Cloud Computing**  
**January 13<sup>th</sup>, 2020**

# Introductions

- **Class**

- Monday/Wednesday 11:25AM-12:40PM
- John T. Rettaliata Engg Center 104

- **Professor: Ioan Raicu** <iraicu@cs.iit.edu>

- Office Hours Time: Wednesday 12:45PM-1:45PM (SB226B)
- More Information:

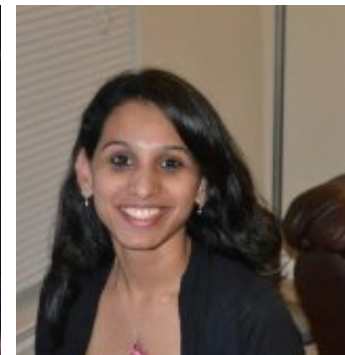
- <http://www.cs.iit.edu/~iraicu/>
- <http://datasys.cs.iit.edu/>



**Ioan**



**Alex**



**Poornima**

- **TAs**

- **Alex Orhean**

- [aorhean@hawk.iit.edu](mailto:aorhean@hawk.iit.edu)
- Mon 12:45PM-1:45PM (SB007), Thursday 2:00PM-3:00PM (SB007)

- **Poornima Nookala**

- [pnookala@hawk.iit.edu](mailto:pnookala@hawk.iit.edu)
- Tuesday 12:45PM-1:45PM (SB007), Friday 2:00PM-3:00PM (SB007)

# Course Overview

- This course is a tour through various topics and technologies related to Cloud Computing
- Explore solutions and learn design principles for building large network-based systems, to support compute and data intensive computing across geographically distributed infrastructures
- Discussions often grounded in real Cloud Computing systems:
  - Amazon AWS (EC2, S3, SQS), Microsoft Azure, Google AppEngine, OpenStack, Google's MapReduce, Yahoo's Hadoop, Spark, etc

# Course Overview (cont)

- Understand methods and approaches to:
  - Design, implement, and evaluate cloud computing systems
- Course involves:
  - Lectures, outside invited speakers, programming assignments, written homeworks, and exams
- Prerequisites:
  - Required: CS450 (Operating Systems) or CS455 (Data Communication)
  - Helpful: CS451, CS542, CS546, CS550, CS551, CS554, CS562, and CS570
- Required texts:
  - [Cloud Computing for Science and Engineering](#), by Ian Foster and Dennis B. Gannon. ISBN: 9780262037242

# Course Topics

- Distributed System Models
- Parallel Computing
- Cloud Platform Architectures
- Cloud Programming
- Performance Evaluations

# Assignments

- 10 total assignments
  - Individual assignments
  - 5%~10% of overall grade each
  - 1~2 weeks to complete each
  - Written homework
    - Will help with theoretical aspects of cloud computing
  - Programming assignments
    - Will help with practical aspects of cloud computing
    - Expected to know (or learn quickly) some of these languages and systems: Linux, Virtual Machines, Amazon AWS, Hadoop, Spark, multi-threading, sockets, C/C++, Java, Python, Bash, GIT

# Assignments (examples)

- Question and Answers
- Compare private and public cloud solutions
- Compare containers and virtual machines
- Setup a virtual machine, understand the basics of the VM configuration, write some bash scripts, use GIT source code version control
- Implement system benchmarks (processor, memory, disk, and network), and conduct system performance evaluation
- Implement single node sort benchmark and compare to distributed sort on Hadoop and Spark
- Implement load balancer through distributed message queues to run application in parallel
- Deploy OpenStack with a variety of services
- Implement distributed storage using a distributed key/value storage system

# Cheating will not be tolerated

- MOSS: Measure Of Software Similarity  
<https://theory.stanford.edu/~aiken/moss/>
- Automatic system for determining the similarity of programs
  - We will compare to past submissions starting from 2011
- Supports many languages:
  - C, C++, Java, C#, Python, Visual Basic, Javascript, FORTRAN, ML, Haskell, Lisp, Scheme, Pascal, Modula2, Ada, Perl, TCL, Matlab, VHDL, Verilog, Spice, MIPS assembly, a8086 assembly, a8086 assembly, MIPS assembly, HCL2
- **You will receive a 0 on assignment; extremely serious offences will fail the course**



# MOSS Plagiarism Detection

## Moss Results

Tue Sep 8 23:29:31 PDT 2015

Options -l python -d -m 10

[ [How to Read the Results](#) | [Tips](#) | [FAQ](#) | [Contact](#) | [Submission Scripts](#) | [Credits](#) ]

File 1	File 2	Lines Matched
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (99%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (99%)</a>	86
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (76%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (66%)</a>	91
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (81%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (82%)</a>	69
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (70%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (61%)</a>	70
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (69%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (40%)</a>	71
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (56%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (50%)</a>	43
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (62%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (55%)</a>	67
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (55%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (48%)</a>	40
<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (54%)</a>	<a href="#">/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/6/raw/XXXXXXXXXX/ (55%)</a>	40

# MOSS Plagiarism Detection

/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/4/raw/██████████ (68%)	██████████	/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/4/raw/██████████2/ (73%)	██████████
4-71	██████████	2-66	██████████
95-111	██████████	90-106	██████████
74-91	██████████	69-86	██████████
115-132	██████████	110-127	██████████

```

/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/4/raw/██████████
>>>> file: LongJump.py
#S██████████a
██████████

print("***** Long Jump Information System *****")
print("Please enter the names of competitors. (Press return when done.)")
print("Competitor no. 1:")
competitor = input()
b,c,g,h,d,k = 1,0,0,0,[],0
maxi,competitors = [],[competitor]
while True:
    b += 1
    print("Competitor no. "+str(b)+":")
    competitor = input()
    if competitor == "":break
    else:
        competitors.append(competitor)
print("Please enter the distances for each competitor.")
for each in competitors:
    print("Competitor " each "-" sep="")
    at1 = input("Attempt 1:\n")
    at2 = input("Attempt 2:\n")
    at3 = input("Attempt 3:\n")
    x = (at1+at2+at3).lower()
    if (at1+at2+at3).find("oul") != -1:
        x = (at1+at2+at3).lower()
        d.append(at1)
        d.append(at2)
        d.append(at3)
    else:
        maxi.append(max(eval(at1),eval(at2),eval(at3)))

```

```

/home/ubuntu/Projects/work/2015/uct-csc1010h/tutorials/4/raw/██████████
>>>> file: LongJump.py
██████████

print("***** Long Jump Information System *****")
print("Please enter the names of competitors. (Press return when done.)")
print("Competitor no. 1:")
competitor = input()
b,c,g,h,d,k = 1,0,0,0,[],0
maximums,competitors = [],[competitor]
while True:
    b += 1
    print("Competitor no. "+str(b)+":")
    competitor = input()
    if competitor == "":break
    else:
        competitors.append(competitor)
print("Please enter the distances for each competitor.")
for each in competitors:
    print("Competitor " each "-" sep="")
    attempt1 = input("Attempt 1:\n")
    attempt2 = input("Attempt 2:\n")
    attempt3 = input("Attempt 3:\n")
    g = (attempt1+attempt2+attempt3).lower()
    if (attempt1+attempt2+attempt3).find("oul") != -1:
        g = (attempt1+attempt2+attempt3).lower()
        d.append(attempt1)
        d.append(attempt2)
        d.append(attempt3)
    else:
        maximums.append(max(eval(attempt1),eval(attempt2),eval(attempt3)))
    d.remove("foul")
    if not "foul" in d:

```

# Exams

- 1 Final Exam
- The exam will be individual
  - Closed book or notes
  - No electronic devices such as phones, eReaders, tables, or laptops will be allowed
  - The exam is worth 30% of the final grade
- Schedule:
  - Exam will take place during official exam week between May 4<sup>th</sup> and May 9<sup>th</sup> 2020
- **There will be no makeup exam.**

# Late Policy

- Assignments will be due at 11:59PM on the date they are due; there will be a 15 minute grace period
- Late assignments will be penalized 10% per day
- Exams: There will not be any makeup exams; do not miss any exam or you will get a 0

# Grading

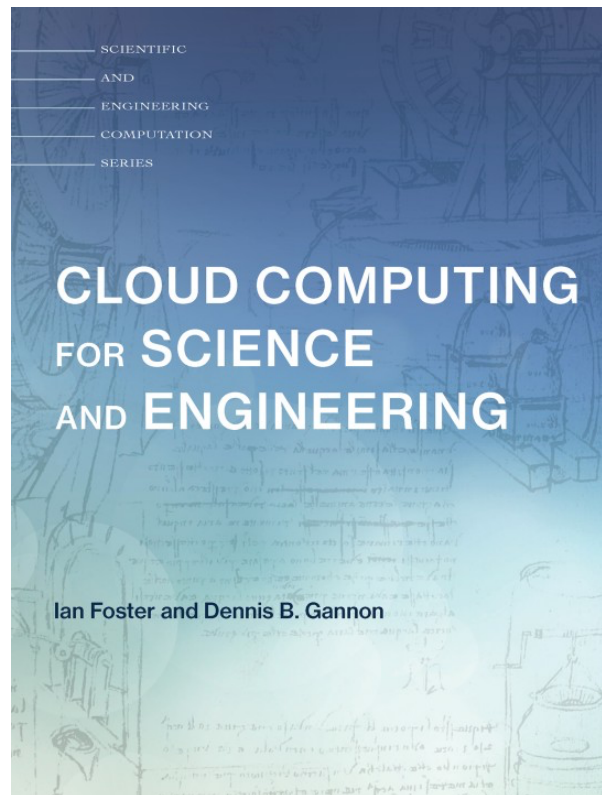
- Breakdown:
  - Assignments (10): 70%
  - Exam (1): 30% -- NO MAKEUPS
- Scale (graduate students):
  - **A**: 85% ~ 100%
  - **B**: 70% ~ 84% → class average
  - **C**: 50% ~ 69%
  - **E**: 0% ~ 49%

# Grading (undergrads)

- Scale:
  - **A:** 85% ~ 100%
  - **B:** 70% ~ 84%
  - **C:** 60% ~ 69%
  - **D:** 50% ~ 59%
  - **E:** 0% ~ 49%

# Required texts

- We will be using the textbook [Cloud Computing for Science and Engineering](#), by Ian Foster and Dennis B. Gannon (ISBN: 9780262037242).



# Questions

- Write me:
  - [iraicu@cs.iit.edu](mailto:iraicu@cs.iit.edu)
- Call me:
  - 1-312-567-5704
- Write the TAs and me:
  - [arhean@hawk.iit.edu](mailto:arhean@hawk.iit.edu)
  - [pnookala@hawk.iit.edu](mailto:pnookala@hawk.iit.edu)
- Online discussion forum:
  - <http://piazza.com/iit/spring2020/cs553/home>