TCSS 462/562: (SOFTWARE ENGINEERING FOR) CLOUD COMPUTING

Team 4, 10, 11, 14, 15 Presentations

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OFFICE HOURS – FALL 2024

- **THIS WEEK**
- **Tuesday:**
  - 2:30 to 3:30 pm - CP 229
- **Friday:**
  - 1:00 to 2:00 pm - Zoom

> Office Hours set based on Student Demographics survey feedback

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OBJECTIVES – 12/5

- **Questions from 12/3**
- Tutorials Questions
- Class Presentations Schedule - Cloud Technology or Research Paper Review
- Tutorial 8: AWS Step Functions, AWS SQS
- Term Project Report / Presentation

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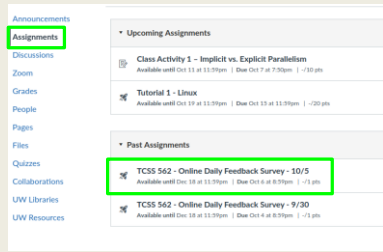
ONLINE DAILY FEEDBACK SURVEY

- Daily Feedback Quiz in Canvas – Take After Each Class
- Extra Credit for completing



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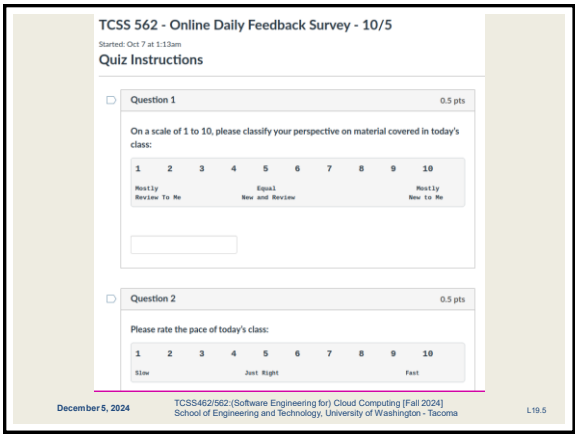

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MATERIAL / PACE

- Please classify your perspective on material covered in today's class (**36** respondents):
- 1-mostly review, 5-equal new/review, 10-mostly new
- **Average – 4.86 (↓ - *previous 5.66*)**

- Please rate the pace of today's class:
- 1-slow, 5-just right, 10-fast
- **Average – 5.02 (↓ - previous 5.15)**

- **Response rates:**
- TCSS 462: 24/41 – 58.5%
- TCSS 562: 12/20 – 60.0%

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FEEDBACK FROM 12/3

- ***For the term project, after we have data from using the SAAF template for both Java and Python, is all we need to do is complete the metrics, design trade-offs, slides, and recording?***
- Once there is both a Java and Python implementation, you'll conduct performance experiments to test average performance, scaling performance, throughput, etc.
- You'll conduct experiments to analyze the design-tradeoffs and assess metrics
- With the experimental results, you'll produce data tables and graphs, and then produce:
  - 462: slides (+recording) or paper
  - 462/562 mix: paper
  - 562: paper

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Don't Forget to Terminate (Shutdown) all EC2 instances for Tutorials 3 & 7

Tutorial 3 spot instance:
c5d.large instance @ ~3.2 cents / hour

$0.78 / day
$5.48 / week
$23.78 / month
$285.42 / year

AWS CREDITS → → → → → → → →

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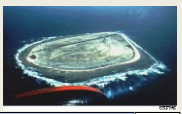
TUTORIAL SUBMISSION TIME

- Tutorials can now be submitted on the due date until the very last minute of the day **Anywhere-on-Earth (AOE)**
  - **Equivalent to 4:59 AM Pacific Standard Time (PST)**
- Anywhere-on-Earth timezone: **Baker Island, Pacific Ocean**
- https://www.timeanddate.com/time/zones/aoe
- Uninhabited island in Pacific Ocean

Coordinates	0°11′45″N 176°28′45″W
Area	2.1 km2 (0.81 sq mi)
Length	1.81 km (1.125 mi)
Width	1.13 km (0.702 mi)
Coastline	4.8 km (2.98 mi)
Highest elevation	8 m (26 ft)
Population	0 (2000)



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TUTORIAL 6 – NOV 29 AOE

- Introduction to Lambda III: Serverless Databases
- https://faculty.washington.edu/wlloyd/courses/tcss562/tutorials/TCSS462_562_f2024_tutorial_6.pdf
- Create and use Sqlite databases using sqlite3 tool
- Deploy Lambda function with Sqlite3 database under /tmp
- Compare in-memory vs. file-based Sqlite DBs on Lambda
- Create an Amazon Aurora "Serverless" v2 MySQL database
- Using an ec2 instance in the same VPC (Region + availability zone) connect and interact with the database using the mysql CLI app
- Deploy an AWS Lambda function that uses the MySQL "serverless" database

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TUTORIAL 7 – DEC 1 AOE

- Introduction to Docker
- https://faculty.washington.edu/wlloyd/courses/tcss562/tutorials/TCSS462_562_f2023_tutorial_7.pdf
- Complete tutorial using Ubuntu 22.04 (for cgroups v2)
- Complete using **c5.large ec2 instance** (for consistency)
- Use DOCX file for copying and pasting Docker install commands
- Topics:
  - Installing Docker
  - Creating a container using a Dockerfile
  - Using cgroups virtual filesystem to monitor CPU utilization of a container
  - Persisting container images to Docker Hub image repository
  - Container vertical scaling of CPU/memory resources
  - Testing container CPU and memory isolation

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GROUP PRESENTATIONS

- TWO OPTIONS:
- ***Cloud technology presentation***
- ***Cloud research paper presentation***
  - Recent & suggested papers will be posted at: http://faculty.washington.edu/wlloyd/courses/tcss562/papers/
- **Presentation dates:**
  - Tuesday November 28, Tuesday November 30
  - Tuesday December 5, Thursday December 7
- **Peer Reviews**
  - Word DOCX form will be provided, fill out, submit PDF on Canvas
  - Feedback shared with groups
  - TCSS 462: 1 review/day required, additional are extra credit
  - TCSS 562: same as 462, but no peer review req'd on day of your talk

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GROUP PRESENTATIONS

- 10 Presentation Teams
- 3 Cloud Technology Talks
- 7 Cloud Research Paper Presentations
- 3 one-person teams
- 4 two-person teams
- 3 three-person teams

- Thank you for the submissions

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PRESENTATION SCHEDULE - 2

- **<Thursday December 5>**

1. **Team 4**: Viktoria Dolojan and Carla Peterson
   Research paper: ***FootPrinter: Quantifying Data Center Carbon Footprint***
2. **Team 10**: Andrew Jang, Shrey Srivastava, Naga
   Cloud Technology: ***SageMaker: training configurations***
3. **Team 11**: Roark Zhang
   Research paper: ***Process-as-a-Service: Unifying Elastic and Stateful Clouds with Serverless Processes***
4. **Team 14**: Sanya Sinha, Jackson Davis
   Research paper: ***Goldfish: Serverless Actors with Short-Term Memory State for the Edge-Cloud Continuum***
5. **Team 15**: Jackson Goldberg
   Research paper: Harmonizing Efficiency and Practicability: Optimizing Resource Utilization in Serverless Computing with Jiagu

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TUTORIAL 8 – DEC 12 (FIRM)

- Introduction to AWS Step Functions and Amazon Simple Queue Service (SQS)
- Not Required, available for extra credit
  - adds points to overall tutorials score
- https://faculty.washington.edu/wlloyd/courses/tcss562/tutorials/TCSS462_562_f2024_tutorial_8.pdf

- Tasks
  - Adapt Caesar Cipher Lambda functions for use with AWS Step Functions
  - Create AWS Step Functions State Machine
  - Create a BASH client to invoke the AWS Step Function
  - Create Simple Queue Service Queue for messages
  - Add message to SQS queue from AWS Lambda function
  - Modify AWS Step Function Bash client script to retrieve AWS Step Function result from SQS queue

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TERM PROJECT PAPER / PRESENTATION

- **EXTRA CREDIT FOR EARLY SUBMISSION:**
- By 2pm Wednesday December 11: +5 % points
- By 2pm Thursday December 12: +3 % points
- By 2pm Friday December 13: +1 % points
- Submissions close Saturday December 14 @ 4:59 AM
  - No submissions after this time – can not grade project for Fall 2024
- TCSS 462 ONLY Teams can submit a presentation video, instead of a term project paper
- TCSS 562 and mixed teams submit term project paper

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TERM PROJECT PEER REVIEWS

- **Worth 12% of the overall term project grade (4.2% of course grade)**
- Provide anonymous feedback on team members
- Based on Dr. Josh Tenenberg's team member evaluation originally designed for TCSS 360
- Every team member must submit for team to receive a term project grade
- Must be submitted on-time
- Must be submitted early for term project extra credit
- Extra credit applied for entire team or no one

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QUESTIONS

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