CSC 3210 Computer Organization and Programming

Assignment #5

Fall 2018

due Monday, December 3rd, 11:59 pm

Learning Objectives: 1) Use Slack, GitHub, and Word processor and create Videos to develop your soft skills— verbal and written communication, cooperation, decisions making, tasks identifications, planning, and scheduling, conflict resolution. **2)** Identify the basics of parallel computing architectures and programming, **3)** MapReduce.

Important Note: (read this carefully please)

As you will find out, group work isn't always easy—team members sometimes cannot prepare for or attend group sessions because of other responsibilities, and conflicts often result from differing skill levels and work ethics. When teams work and communicate well, however, the benefits more than compensate for the difficulties. One way to improve the chances that a team will work well is to agree beforehand on what everyone on the team expects from everyone else. Reaching this understanding is the goal of the assignment.

Team Policies:

- Rotate the coordinator role for each assignment.
- You are all expected to cooperate.
- Do the required individual preparation.
- Agree on a common meeting time and what each member should have done before the meeting (readings, taking the first cut at some or all of the assigned work, etc.)
- A team coordinator:
  - interfaces between the instructor and the team.
  - turning in the documents with the names on it of every team member who participated actively in completing it. **Only the team coordinator is responsible for submitting the project assignment.**
  - review returned assignments and make sure everyone understands why points were lost and how to correct errors.
  - bringing team questions to the instructor coordinator
  - receiving and returning the Raspberry PI
  - checks with other team members before the meeting to remind them of when they will meet and what they are supposed to do.
  - **with the help of the team members, identifying, assigning, and scheduling tasks to the team members**
  - monitoring and reporting the progress of the assigned tasks
  - coordinator team members
- Consult with your instructor if a **conflict** arises that can't be worked through by the team.
  - Dealing with **non-cooperative team members**:
    - If a team member refuses to cooperate on an assignment, her/ his name **should be included in the tasks table with "she/he did not do the or partially did the assigned task"** on the note column and zero will be assigned for that assignment.
    - If the problem persists, the team should meet with the instructor so that the problem can be resolved, if possible, otherwise, grade of zeroes will be assigned for the remaining assignments

Task1: (11p) **Planning and Scheduling:**

- (4p) Choose a new team coordinator.
  - The team coordinator should contact the team members and discuss when and where to meet to discuss the following tasks.
  - The coordinator role will be rotated for each assignment.
- (7p) Create a table and have every member's name, assigned task or tasks, etc. **Ex**.:

Work Breakdown Structure

Assignee Name	Email	Task	Duration (hours)	Dependency	Due date	Note
Awad Mussa	amussa@gsu.edu	Technical writing (getting the report ready) as described in the assignment	5 hours	Slack, GitHub, and the video (these have to be done first)	02/22/18	Must be ready 30 hours before the due date
James Siemen (**coordinator**)	exmple@gsu.edu	Creating the slack account as described in the assignment	2 hours	none	02/19/18	Please send everybody the link and ask them to login and write their member introduction: name, interest, expectation from this project
Michael Jorden	exmple@gsu.edu	Did not do the assigned task	Did not do the assigned task	Did not do the assigned task	Did not do the assigned task	Brian and Mike did it.

Task2: (10p) **Collaboration:**

- **Slack:**
  - (5p) Send an invitation to your TA (Kexin Ding: kding3@student.gsu.edu)

    Note: Please use slack as your main medium of communication. Your TA will check up on you so please make sure it is used.
- **GitHub:**
  - (5p) Using the project you created in A2, identify new To do; In progress; and Done columns for A4. Under these columns, create your own cards and have the assigned tasks and their status (in progress and done) written there as a list. Submit a screen shoot of your project page.

Task3: (130p) **Parallel Programming Skills:**

a) (70p) **Foundation:** (reading material for this section is available at iCollege, Week13, Project: Assigenmnt5 folder, Introduction to Parallel Computing_4.pdf, Introduction to Parallel Programming and MapReduce.pdf).

Note: It is expected that you answer the questions using your own words (paraphrasing).

- (56p) Read this paper "**Introduction to Parallel Programming and MapReduce**" and answer the following questions:
  - (15p) What are the basic steps (show all steps) in building a parallel program? Show at least one example.
  - (5p) What is MapReduce?
  - (10p) What is map and what is reduce?
  - (5p) Why MapReduce?
  - (5p) Show an example for MapReduce.
  - (10p) Explain in your own words how MapReduce model is executed?

- (6p) List and describe three examples that are expressed as MapReduce computations.

- (6p) When do we use OpenMP, MPI and, MapReduce (Hadoop), and why?
- (14p) In your own words, explain what a Drug Design and DNA problem is in no more than 150 words.

b) (60P) **Parallel Programming Basics: Drug Design and DNA in Parallel**

- See the Tasks description in Parallel Programming Task file (available at iCollege, Week13, Project: Assigenmnt5 folder, Parallel_Programming_Task_4.pdf)
  - You need to submit a detailed lab report to describe:
    - (40p) What you have done and what you have observed, including screenshots and code snippets. Simply attaching screenshots and code snippets without any explanation will not receive credits. You also need to provide explanation to the observations that are interesting or surprising.

Task4: (29p) **Presentation** (verbal communication)**:**

a) **Video**:

- (14p) What to do: (**Every team member must participate in this video**)
  - (2p) Introduce yourself.
  - (2p) Identify your task for this assignment.
  - (3p) What have you learned from this assignment (2-3 key things)?
  - (4p) How will you apply what you learned in your next assignment, academic life (future classes), and in the future (job)?
  - (3p) What was the best/most challenging/worst experience you encountered?
- (15p) How to do it:
  - (5p) Use your smart phone camera. Make sure the voice and picture are clear.
  - (5p) Upload the video to the channel you created in Assigenmnt1.
  - (4p) This video must be 3-8 minutes. You will lose points if it is more than 8m.
  - (1p) Include the link to this channel with your report.

Task5: **(15p) Report (**written communication**):**

- (2p) A title page (first page) has:
  - (1p) project title: **Developing Soft and Parallel Programming Skills Using Project-Based Learning**,
  - (1p) semester (Fall-2018), group name, group members' names,
- (3p) Text format should be:
  - (1p) Font size 12, Font type is times new roman, single space between lines.
  - (1p) All paragraphs must Text Justified.
  - (1p) Pages are numbered
- (3p) Report sections:
  - Planning and Scheduling: have Task 1 here
  - Parallel Programming Skills here
  - Appendix: have the links (slack, GitHub, and video links) here

- (1p) All text must be produced on a word processor and convert it to PDF format.
- (6p) You (the team coordinator for this assignment) will also print out a copy of the report and submit it in person to the instructor during the office hours on **Tuesday December 4th**: From 12noon to 1:30pm

  Note:

  You will submit the document electronically through iCollege as a PDF file:
  - The file you submit should be named coordinatorName_Groupname.pdf
  - Only the team coordinator should submit the report.

Task6: (5P) Return the Raspberry Pi

- **Format the PI** (After you are done with assignmen5):
  - To do this, you will need an SD card reader on your laptop.
  - Choose one of the following:

    a. Windows (32GB cards and under)

    i. Download the SD Association's Formatting Tool from https://www.sdcard.org/downloads/formatter_4/eula_windows/

    ii. Install and run the Formatting Tool on your machine

    iii. Check that the SD card you inserted matches the one selected by the Tool

    iv. Click the "Format" button

    b. Mac (32GB cards and under)

    i. Download the SD Association's Formatting Tool from https://www.sdcard.org/downloads/formatter_4/eula_mac/

    ii. Install and run the Formatting Tool on your machine

    iii. Select "Overwrite Format"

    iv. Check that the SD card you inserted matches the one selected by the Tool

    v. Click the "Format" button
- The team coordinator needs to return the PI along with the project report on **Tuesday December 4th**: From 12noon to 1:30pm.
  - **Failing to return the PI as you received it will result in assigning zero grade for the whole project (25% of your grade) and all team members.**