Computer Programming (C/C++) MECH0291

Example Midterm Exam

Group 1/A

November 25, 2022, 17:00–21:00

Student Name :
Student ID :
Department :

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Question:	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	Total
Points:	25	25	25	25	10	10	120
Score:							

Instructions

1. This booklet contains 2 pages.
2. You have 75 minutes to complete the examination.
3. You may **only** use the Terminal Application in this exam. You **may not** use any web browser or any other programs.
4. Only students who has an appropriate GitLab Repository can join this exam. Your $USER_NAME should be in `yourStudentID_name_surname` format.
5. Start with the commands below to set the computer that you use GitLab on the exam computer.
   - `git config --global user.name "$USER_NAME"`
   - `git config --global user.email "$USER_EMAIL"`
6. Remove the old `ComputerProgramming2022` folder if exists on your working directory.
7. Download your ComputerProgramming2022 repository from GitLab with the command below, create a folder as `MidtermExam` if you do not have already created, and put the files you make in this exam in this folder.
   - `git clone https://gitlab.com/$USER_NAME/ComputerProgramming2022.git`
8. At the end, you must upload your codes into the same repository using the commands below. Those files will be evaluated and marked as your midterm exam grade.
   - `git add MidtermExam`
   - `git commit -m "Add MidterExam"`
   - `git push origin main`
9. Add your student ID, name and surname as a comment on the top of each scripts you write in this exam.
10. You may use one (1) double-sided A4 paper (210×297 mm^2) with notes that you have prepared in your handwriting. You may not use printed or photocopied paper sheets, lecture notes, books, or other students.
11. The maximum point you can obtain in this exam is 100.

Q1. (25 points) Write a shell script (shell1.sh) in MidtermExam folder as described below.

- Create a directory so called shell1. Change shell1.sh's working directory into it.
- Make 3 directories with the names 1, 2 and 3 in shell1.
- Make 11 directories with the names 1 to 11 in each 3 directories (1, 2 and 3). The folder names should have four characters, filled with zeros such as (0005 and 0010).
- Generate 101 text files with the names 1 to 101 in each 3×11 folders. File names should have four characters except the file extension (e.g. 0001.txt).
- Write the relative path to your working directory (MidtermExam) into each file as "This is nth file in $RELATIVE_PATH.". Here n is the file number from 1 to 101 without zeros.
- Make the shell script executable.

Q2. (25 points) Write a shell script (shell2.sh) in MidtermExam folder as described below.

- Create a directory so called shell2. Do not change shell2.sh's working directory into it.
- Make 3 directories in shell2. Read the names from the commandline. Name the folders as F1, F2 and F3.
- Make 13 directories with the names 1 to 13 in each 3 directories (F1, F2 and F3). The folder names should have four characters, filled with zeros such as (0005 and 0010).
- Generate 20 text files with the names 20 to 115 skipping 5 in each 3×13 folders. File names should have three characters except the file extension (e.g. 020.txt).
- Write in the files if it is an odd number file or an even number file. Such as, "This is an odd file." in 020.txt.
- Make the shell script executable.

Q3. (25 points) Write a Python script (python1.sh) in MidtermExam as described below.

- Make a folder as python_output.
- Create a 3×1000 array of ones.
- Multiply each element of the array with the column number, row number and π number.
- Write the array into a text file and a binary file, both located in python_output folder.
- Check the sizes of the files and print as, for example "Size of text.txt file is 10MB and binary file 10MB.".
- Make the Python script executable.

Q4. (25 points) Write a Python script (python2.sh) in MidtermExam as described below.

- Use argument parser module to read
  - an output file name, and
  - two folder names from the commandline.
- Make two folders with the names full_ones and ones_with_fives in python_output folder. Read these names as argument.
- Create a 2×50 array of ones.
- Write the array into a binary file with the name you read as an argument, in full_ones folder.
- Multiply the both items of each line by five, if the line number is a power of three.
- Write the new array into a binary file with the name you read as an argument, in ones_with_fives folder.
- Make the Python script executable.

Q5. (10 points) Add a README.md file briefly explaining what does each script do in this repository.

Q6. (10 points) Write two shell scripts (run_all.sh and remove.sh) in MidtermExam folder as described below.

- run_all.sh to run all the scripts in this directory, and
- run_all.sh to rint your student id, name, surname and the total points you expect to get from this exam.
- remove.sh to remove all the files and folders you made in this exam, **except**
  - shell1.sh,
  - shell2.sh,
  - python1.py,
  - python2.py,
  - README.md,
  - run_all.sh, and
  - remove.sh.