Tasks:

1. Reproduce the code for the Monty Hall problem (with the name MontyHall.c), submitting source code and screenshots.
2. Make generic the above code (optional).
3. Reproduce the code with Chebyshev polynomials below. Compile the file and submit the source code and a screenshot.

$$\phi_i(x) \in \{1, \ x, \ 2x^2 - 1, \ 4x^3 - 3x, \ 8x^4 - 8x^2 + 1, \ 16x^5 - 20x^3 + 5x, \ \cdots\}$$

Then

$$P_N(x) = \sum_{i=0}^{N} b_i \, \phi_i(x),$$

for $0 \le N \le 5$.

1. Using **switch** statement (with name **chebyshev.c**)
2. Plotting the polynomial with Python, using **system()** to run Python script from C.
3. Submit code, figure

4. Push the code to GitHub.
5. File transfer and Up-to-date in Nova cluster

Submission Files and Results:

1. Screenshot for MontyHall.c

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ ./MontyHall

=-=-=-=-=-=-=-=-=-=-=-=-=-
** Monty Hall Simulator **
=-=-=-=-=-=-=-=-=-=-=-=-=-

Pick a door (0, 1, or 2): 0

You entered: 0

Interesting choice ...

I can tell you for sure that the prize is not behind door: 1

Stay with Door 0 (press 0) or switch to Door 2 (press 1): 0

You stayed with Door 0

*** WINNER ***

The prize was behind Door 0
```

2. Screenshot for MontyHallGeneric.c. I developed this to make a generic game by the given number of doors and number of prizes
   a. Scenario-1: Doors 3 and Prizes 1, which is similar to the above

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ ./MontyHallGeneric
How many doors are there? 3
How many prizes are there? 1

=-=-=-=-=-=-=-=-=-=-=-=-=-
** Monty Hall Simulator **
=-=-=-=-=-=-=-=-=-=-=-=-=-

Pick a door (0-2): 0

You entered: 0

Interesting choice ...

I can tell you for sure that the prize is not behind door: 1

Stay with Door 0 (press 0) or switch to Door 1 (press 1): 0

You stayed with Door 0

--- LOSER ---

The prize was behind Door(s): 2
```
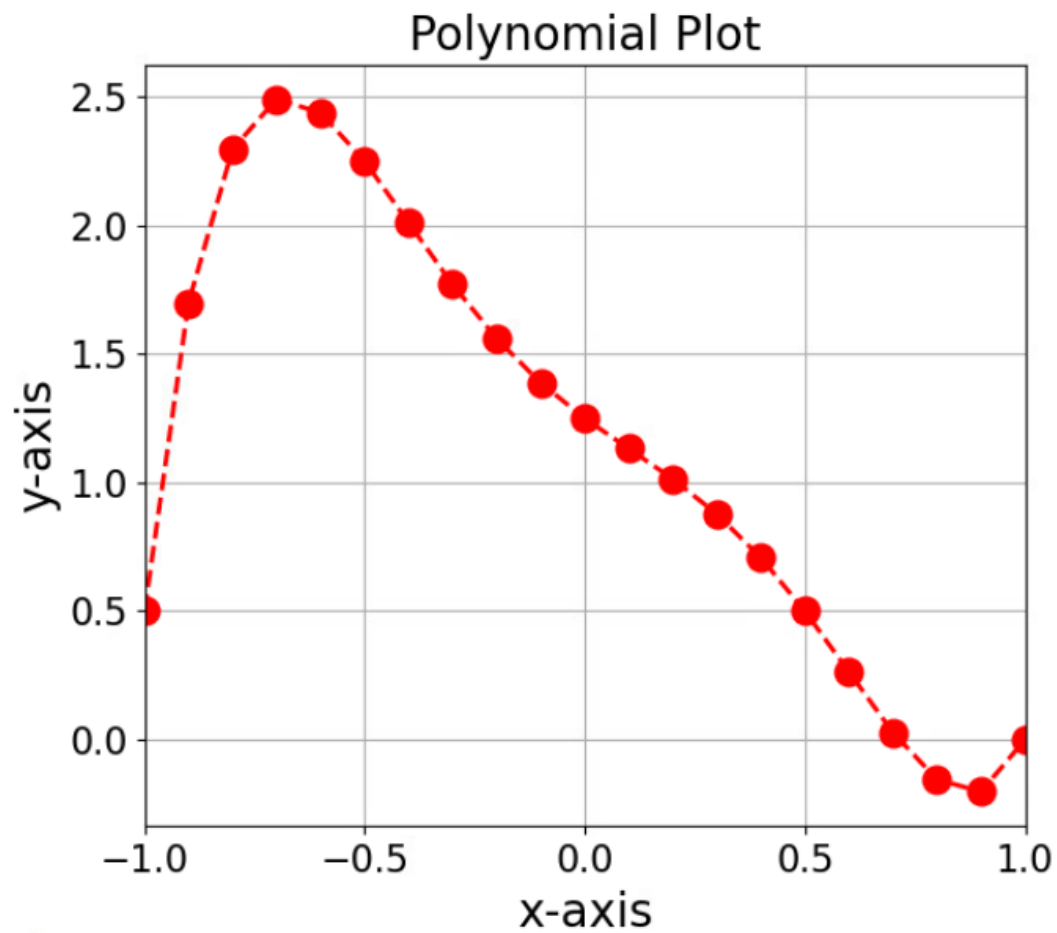
   b. Scenario-2: Doors 3 and Prizes 2

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ ./MontyHallGeneric
How many doors are there? 3
How many prizes are there? 2

=-=-=-=-=-=-=-=-=-=-=-=-=-
** Monty Hall Simulator **
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Pick a door (0-2): 0

You entered: 0

Interesting choice ...

I can tell you for sure that the prize is not behind door: 1

Stay with Door 0 (press 0) or switch to Door 1 (press 1): 0

You stayed with Door 0

*** WINNER ***

The prize was behind Door(s): 2 0
```

c. Scenario-3: Doors 5 and Prizes 2

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ ./MontyHallGeneric
How many doors are there? 5
How many prizes are there? 2

=-=-=-=-=-=-=-=-=-=-=-=-=-
** Monty Hall Simulator **
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Pick a door (0-4): 0

You entered: 0

Interesting choice ...

I can tell you for sure that the prize is not behind door: 2

Stay with Door 0 (press 0) or switch to Door 2 (press 1): 0

You stayed with Door 0

--- LOSER ---

The prize was behind Door(s): 4 1
```

3. Screenshot for the Chebyshev

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ gcc Chebyshev.c -o Chebyshev -lm
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/8
. Lab Assignment 9$ ./Chebyshev

Input polynomial degree (0-5): 5

Set b[0]: 1
Set b[1]: -1
Set b[2]: -0.5
Set b[3]: 0.5
Set b[4]: -0.25
Set b[5]: 0.25
```


4. Push the code to GitHub
   a. Git status check

```
nothing added to commit but untracked files present (use "git add" to track)
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$
git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .vscode/
        7. Lab Assignment 8/7. Lab Assignment 8 Submission.pdf
        8. Lab Assignment 9/
```

b. Git add and git status

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$
git add .
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$
git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   .vscode/c_cpp_properties.json
        new file:   7. Lab Assignment 8/7. Lab Assignment 8 Submission.pdf
        new file:   8. Lab Assignment 9/Chebyshev
        new file:   8. Lab Assignment 9/Chebyshev.c
        new file:   8. Lab Assignment 9/MontyHall
        new file:   8. Lab Assignment 9/MontyHall.c
        new file:   8. Lab Assignment 9/MontyHallGeneric
        new file:   8. Lab Assignment 9/MontyHallGeneric.c
        new file:   8. Lab Assignment 9/PlotPoly.py
        new file:   8. Lab Assignment 9/polydata.txt
        new file:   8. Lab Assignment 9/polynomial.png
```

c. Git committed the files

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$
git commit -m 'Adding Files'
[main 634a314] Adding Files
 11 files changed, 397 insertions(+)
 create mode 100644 .vscode/c_cpp_properties.json
 create mode 100644 7. Lab Assignment 8/7. Lab Assignment 8 Submission.pdf
 create mode 100755 8. Lab Assignment 9/Chebyshev
 create mode 100644 8. Lab Assignment 9/Chebyshev.c
 create mode 100755 8. Lab Assignment 9/MontyHall
 create mode 100644 8. Lab Assignment 9/MontyHall.c
 create mode 100755 8. Lab Assignment 9/MontyHallGeneric
 create mode 100644 8. Lab Assignment 9/MontyHallGeneric.c
 create mode 100644 8. Lab Assignment 9/PlotPoly.py
 create mode 100644 8. Lab Assignment 9/polydata.txt
 create mode 100644 8. Lab Assignment 9/polynomial.png
```

d. Git push

e. Final GitHub repository

5. Files transferred and up-to-date in Nova cluster.

```
[vsc@nova ~]$ tree
.
└── CPRE525Spring2023
    ├── 1. Lab Assignment 2
    │   ├── 1. Lab Assignment 2 Screen Shots for both 2 and 3 steps.pdf
    │   ├── demo_myfuncs.py
    │   └── myfuncs.py
    ├── 2. Lab Assignment 3
    │   ├── 2. Lab Assignment 3 Screen Shots.pdf
    │   └── demo_pythonlist.py
    ├── 3. Lab Assignment 4
    │   ├── 3. Lab Assignment 4 Submission.pdf
    │   ├── demo_myfuncs.py
    │   ├── myfuncs.py
    │   └── __pycache__
    │       └── myfuncs.cpython-39.pyc
    ├── 4. Lab Assignment 5
    │   ├── 4. Lab Assignment 5 Submission.pdf
    │   ├── guass_elimination_solve.py
    │   └── practice_numpyLinearAlgebra.py
    ├── 5. Lab Assignment 6
    │   ├── 5. Lab Assignment 6 Submission.pdf
    │   ├── gauss_elimination_cpre525.py
    │   ├── mylinalg.py
    │   └── __pycache__
    │       └── gauss_elimination_cpre525.cpython-310.pyc
    ├── 6. Lab Assignment 7
    │   ├── 6. Lab Assignment 7 Submission.pdf
    │   ├── Factorial
    │   └── Factorial.c
    ├── 7. Lab Assignment 8
    │   ├── 7. Lab Assignment 8 Submission.pdf
    │   ├── data.txt
    │   ├── lab8
    │   └── lab8.c
    ├── 8. Lab Assignment 9
    │   ├── Chebyshev
    │   ├── Chebyshev.c
    │   ├── MontyHall
    │   ├── MontyHall.c
    │   ├── MontyHallGeneric
    │   ├── MontyHallGeneric.c
    │   ├── PlotPoly.py
    │   ├── polydata.txt
    │   └── polynomial.png
    ├── LICENSE
    └── README.md

11 directories, 34 files
```