|  |  |
| --- | --- |
|  | **Object Oriented Programming (April 2023)**  **Final Project**  Weight: 20 points, representing 10% of final course grade  Instructors: Dr. Ebo Adjepon-Yamoah, Dr. Ayorkor Korsah |

**Introduction**

The theme for the class project is **Climate Change**. The project was kicked off with a presentation by Mr. Gideon Osabutey introducing the concepts of climate science, climate change, mitigation and adaptation.

Your goal for the class project is create a program modeling any aspect of the presented concepts, related to this theme, that is of interest to you. For example, you could create a model to illustrate some aspect of climate science, or you could create a program that models an approach to mitigating climate change, or an approach to adapting to climate change.

**Project Technical Requirements**

* Your project should apply the object-oriented programming paradigm and include at least four classes (and not more than ten classes) that interact with each other in a variety of ways (for example, a class could have an object of another class as an instance variable, or could take an instance of another class as a parameter to one of its methods, or could return an instance to another class as a return value from one of its methods, etc.). Most of your classes must have substantial/significant logic in at least one of the methods (i.e. not only getter/setter methods)
* Your project should involve the use of inheritance and/or interfaces.
* Your project should involve the use of some kind of Java collection
* Your project can *optionally* involve the use of file or network I/O, but this is not required.
* Your project can *optionally* involve the use of graphics, but this is not required.

**Team Requirements**

* You will work in teams of three. Each member of the team should participate in all aspects of the project – research, design, implementation, and reporting. All members should be able to explain all aspects of the project. Work together and support each other.

**Scope**

* Your project should be of an appropriate scope such that your team can complete it in about two weeks – challenge yourself, but try not to “bite off more than you can chew”

**Academic Honesty**

* The solution you submit must be your team’s creation. You can conduct research about your chosen aspect of climate change and you must cite all your sources appropriately. You **may not** search for an implementation (source code) of a solution to your problem on the internet or in any other source, nor may you refer to such an implementation if you happen to come across one. You may not use generative AI tools in your solution. You can make use of external Java libraries if needed, provided you reference them appropriately.

**Project Deliverables and Timeline**

The key project milestones are listed below.

Thursday, 13 April, 2023

* Project teams formed
* Draft of project title and introduction submitted

Thursday, 20 April, 2023

* Project design document submitted

Friday, 21 April, 2023

* Peer review of project design document

Thursday, 27 April, 2023

* Source files (.java files) of complete project implementation
* Readme.txt explaining how to run the program from the command-line
* Recorded project summary and screencast demo (5-7 minutes)
* Updated project design document
* Statement of contributions of each member of the team

**Specification of Project Design Document**

Your project design document should have the following content & structure.

* **Title**: You should have a good title that reflects your chosen project.
* **Authors**:Team members names and cohort
* **Introduction**: Describe your proposed project – what aspect of the project theme you are modeling and any background knowledge that is relevant. Include in-text citations to any reference material. You should have at least one reference.
* **Solution Design:** Describe the structure your solution, what classes you will implement and what they represent, and the relationship between them. Create a UML diagram of your solution.
* **References**: Give your list of references (you should have at least 1), in APA format.

All figures should have captions, under the figure, as is done in the textbook.

**Grading Scheme**

Project Design Document: 7 points

Implementation: 10 points

Recorded project summary and demo: 3 points

**Project Design Document Rubric (7 points)**

|  |  |
| --- | --- |
| **Points** | **Description** |
| 7 | Exceptionally well described project with an exceptionally well-designed solution. Goes above and beyond the specified project technical requirements. |
| 6 | Well described project with well-designed solution   * Project title and introduction are very clearly related to the project theme. Design document is well-written and logical, with no grammatical issues. * Problem analysis has been done to clearly and correctly identify classes and their relationships. * UML diagram is complete and accurate * All project technical requirements are met. |
| 5 | Minor shortcomings in project description and/or program design. |
| 4 | Major shortcomings in project description and/or program design. |
| 1 – 3 | Inadequate project description and/or program design |
| 0 | Did not submit the assignment |

**Implementation Rubric (10 points)**

|  |  |
| --- | --- |
| **Points** | **Description** |
| 9 – 10 | Exceptionally efficient, well structured, well formatted and well documented program. Elegant algorithms and creative solution approaches. Thorough and well documented testing. |
| 8 | Correct, well-structured and formatted program with good documentation and well-chosen test cases. |
| 7 | Working programme with minor shortcomings in correctness, structure, formatting, documentation and/or testing |
| 6 | Working programme with notable shortcomings in correctness, structure, formatting, documentation and/or testing |
| 5 | Good attempt, but major shortcomings in correctness, structure, formatting, documentation and/or testing |
| 2 – 4 | Submitted programme compiles and makes logical but incomplete attempts to address some aspect(s) of the problem |
| 1 | Submitted programme does not compile but makes logical attempts to address some aspect of the problem |
| 0 | Did not submit the deliverable |

**Recorded Demo Rubric (3 points)**

|  |  |
| --- | --- |
| **Points** | **Description** |
| 3 | Well-rehearsed and presented explanation of the project including the solution design. A concise but comprehensive walk-through and demo of the solution. |
| 2 | Minor shortcomings in presentation and/or demo |
| 1 | Major shortcomings in presentation and/or demo |
| 0 | Did not submit the deliverable |

**Guide for Peer Review of Project Design Document**

* Is the title clear, concise and appropriate?
* Is the project clearly related to the project theme of climate change?
* Does the introduction section clearly explain the problem context and what the project seeks to achieve?
* Does the introduction section include references as needed?
* Is the write-up free from grammatical and typographical errors?
* Is the solution well-structured?
  + Have classes, methods and attributes been appropriately identified?
  + Do the nouns in the project description correspond to objects (instances of classes) or attributes of these objects?
  + Do verbs correspond to methods/behaviours?
  + Have appropriate relationships between classes been identified? (E.g. “is-a” relationships can be modeled with inheritance or interfaces, while “has-a” relationships can be modeled by having objects of one class be instance variables of another class.)
  + Are classes, instance variables, methods, etc appropriately named?
  + Is the UML diagram complete and correctly drawn?
  + Are all the project technical requirements satisfied?