Guidelines for the Final Math 1P40 Project
MICA I - Winter 2019-20
Project Due: Thursday April 16 by 7pm in your dropbox in SAKAI

Check the website for past final projects (organized by MICA courses and by types):
www.brocku.ca/mathematics/studentprojects

1) The project is done in pairs (groups of 2)

2) The project consists of an interactive computer environment (in VB.net) together with a written report. It can be one of three types, all of which being considered *equally important*:
   a) an **INVESTIGATION** of a mathematical conjecture/problem/theorem
   b) a "real world" **APPLICATION** of mathematics
   c) a **LEARNING OBJECT** designed to teach/test mathematical concepts at a specific grade level (Grades 5 +)

3) The project should demonstrate sophisticated knowledge of vb.net tools.

4) The interface must be very friendly, self-explanatory and a pleasure to work with.

Written Report. Your hard-copy typed[1] report will have the following information under the indicated headings:

A) **PROJECT TITLE & TYPE**
Provide the name of your project and state whether your program is an Investigation, an Application or a Learning Object.

A-2) **TARGET AUDIENCE (for Learning Objects only)**
State your programs target audience.

B) **PURPOSE AND BACKGROUND**
State the overall mathematical or pedagogical purpose of your project and provide the necessary mathematics background.

C) **SUMMARY OF OBSERVATIONS**
In the case of an Investigation or an Application, give a coherent summary of what you observed. For a Learning Object, describe the experience of a person, 'putting themselves in the shoes of a learner at the appropriate grade level', who worked with your program.

D) **DISCUSSION**

E) **CHECKLIST OF FEATURES**
Provide a checklist of 5 special features of your program for which you should be given credit

[1] Mathematical formula may be added by hand to the write-up.

Grading Schemes

- **PROEJCT TYPE: INVESTIGATION** of a mathematical problem, conjecture, concept, theorem

1) The mathematical problem is interesting and has a good difficulty level (10%)
   There is a clear statement of the investigation; it shows originality and depth
2) The project demonstrates sophisticated knowledge of vb.net tools (20%)
   the project contains (some of the following): great visualization of data, non-trivial programming of mathematics concepts, sophisticated interface features.
3) The interface is very friendly, self-explanatory and a pleasure to work with. It is well designed in order to investigate the problem. (40%)
   easy access to all parameters needed for the investigation, representation of outcomes meaningful to the investigation, the interface is interactive & attractive, communication of navigation is clear
4) Written document: (15% + 15% special features)
   - PROJECT TITLE & TYPE
   - PURPOSE & BACKGROUND: clear statement of the mathematical investigation. Describe in details the mathematics
   - SUMMARY OF OBSERVATIONS: provide some data used for your investigation, and state your observations
   - DISCUSSION: discuss your observations
   - 5 AWESOME FEATURES OF YOUR PROJECT (15%): list 5 attributes of your project that makes it *stunning*

- **PROJECT TYPE:** "real world" **APPLICATION** of mathematics

1) The application is interesting and has a good difficulty level (10%)
   adequate mathematical model to explore the selected real-world situation
2) The project demonstrates sophisticated knowledge of vb.net tools (20%)
   the project contains (some of the following): great visualization of data, non-trivial programming of mathematics concepts, sophisticated interface features.
3) The interface is very friendly, self-explanatory and a pleasure to work with. It is well designed in order to explore the mathematical application. (40%)
   easy access to all parameters needed for the investigation, representation of outcomes meaningful to the investigation, the interface is interactive & attractive, communication of navigation is clear
4) Written document: (15% + 15% special features)
   - PROJECT TITLE & TYPE
   - PURPOSE & BACKGROUND: clear statement of the investigation. Describe in details the mathematics used
   - SUMMARY OF OBSERVATIONS: provide some data used for the investigation of the mathematical model/simulation
   - DISCUSSION: interpret your observations in the context of the real-world situation
   - 5 AWESOME FEATURES OF YOUR PROJECT (15%): list 5 attributes of your project that makes it *stunning*

- **PROJECT TYPE: LEARNING OBJECT** designed to teach/test mathematical concepts

2) The didactical approach to teach/test the mathematical concept is meaningful (10%)
   the approach involves conceptual (ideas, many representations, applications) and procedural understanding

3) The project demonstrates sophisticated knowledge of vb.net tools (20%)
   the Learning Object is engaging (for weaker and stronger users), 'reusable' (.i.e., there are randomly generated questions, and contains either animations, (vb.net) graphs, and/or good interactive features

4) The interface is very friendly, self-explanatory and a pleasure to work with. It is well designed for the didactical purpose (45%)
   the Learning Object is **highly interactive** (it is NOT a textbook put into a sequence of vb.net windows)**,** *the communication of mathematical is clear, the navigation is clear, colors and images are appropriate to the target user, and it's 'fun' (e.g., the context of the Learning Object keeps the user's interest until the end). The user knows at all time what is asked of him/her to do.*

5) Written document (10% + 15% special features)
   - PROJECT TITLE & TYPE
   - TARGET AUDIENCE: identify clearly what users are (grade level and age)
   - PURPOSE & BACKGROUND: identify clearly what mathematical background you expect from the user, and support the background and target audience using the Ontario curriculum document.
   - OBSERVATIONS FROM LEARNING OBJECT TESTING: describe the experience of a person, 'putting themselves in the shoes of a learner at the appropriate grade level', who worked with your program.
   - DISCUSSION: discuss the observations of the person testing your Learning Object
   - 5 AWESOME FEATURES OF YOUR PROJECT (15%): list 5 attributes of your project that makes it stunning