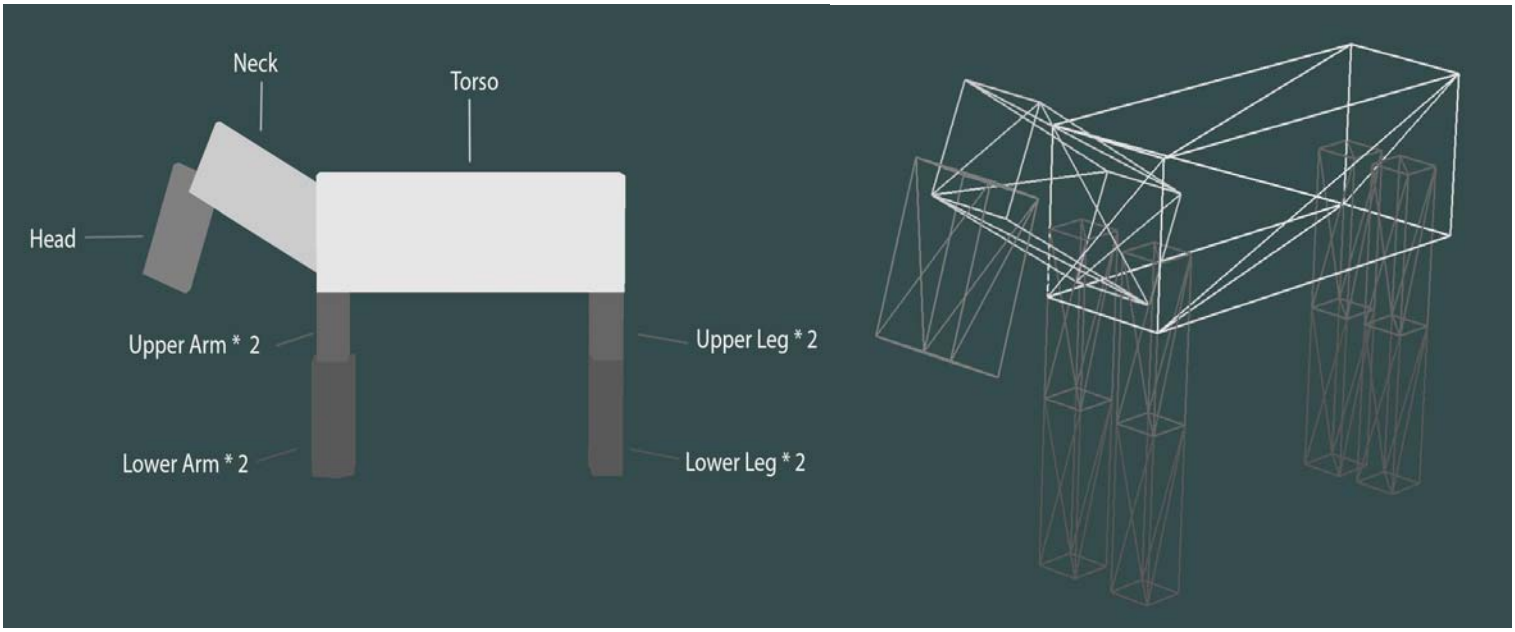
Project Requirements

Announcement:	**Session # 8**
Submission Deadline:	**Session # 13**

Description

This OpenGL programming project will build upon your previous assignments. If you have not completed the assignments, then you may do the necessary components as part of this project. We will give you 4 out of the 10 marks allotted to assignment 2. More specifically, in this project you will learn about placement and animation of multiple objects with collision detection (the animation required is simple movement of objects along a piece-wise linear path).



Implementation Specifications

- Extend your OpenGL application from Assignment 2 with the following functionality and features:
  - Create a troop (group) of 20 horses in random positions and random orientations on the ground surface. If required scale down your horses suitably (uniform or different scaling for different horses).

- Create the following movement for each horse: move straight ahead for n_1 (random) steps, rotate horse right or left (randomly) by 15 degrees. Repeat these in a loop. Set n_1 to lie within reasonable range (10 – 30 steps). Minimally, simply move the horse as a single rigid body. Enhancements would include more elaborate movements like walking, running, jumping etc.
- Implement collision detection (a critical requirement of this project). That is after every step check for collision. If the horse collides with another horse, then randomly decide to hold one horse stationary and only move the other horse.
- Create the above horse troop animation and render continuously (Key H should work as a toggle)

- Please note that your rendered animation should have all the rendering features you implemented in previous assignments - Illumination, shading, texture, shadows, window resizing, etc

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- The application should use OpenGL 3.0 and onwards, and include brief comments explaining each step.

Some Suggested Improvisations:

Depending on your interest and enthusiasm, there are many improvisations possible to the above description. These could include

- Using a terrain for the ground instead of a flat surface and making the horses move over the terrain with their feet on the ground.
- Randomly changing the speeds of different horses.
- Making some horse stand still for a short random period of time.
- Adding head and neck movement to some of the horses during the animation.
- Add walk, run, jump or any other articulated movement for the horses.

Submission (electronic submission through Moodle only)

Please create a zip file containing your C/C++ code, vertex shader, fragment shaders, assets like texture images or models, etc. Please include a readme text file (.txt). In the readme file document the features and functionality of the application, and anything else you want us to know i.e. control keys, keyboard/mouse shortcuts, etc. Your submission should be complete so that we can compile and run your program. Please also submit a maximum of 3 page document describing your project, special features to note, incomplete aspects and reasons if any, etc.

Evaluation Procedure

You MUST demonstrate your project during class/lab hours. You must run your submitted code, demonstrate its full functionality and answer questions about the OpenGL programming aspects of your solution. Your report and code will be further checked for consistency with implementation, structure, non-plagiarism, etc. However, ONLY demonstrated submissions will receive marks. Other submissions will not be marked.