

Project Assignment

This is an opportunity for you to work with a team to design and construct a simple musical instrument from inexpensive materials. You will be asked to explain your design process and the fundamental principles that underlie how your instrument produces various pitches. A primary goal is to demonstrate that you have engaged in the course material and gained enough understanding to explain to someone else how at least one class of instruments works.

Randomly Assigned Groups:

Cabrera, Firko, Wayland
Caneer, Smart, Zarmakoupis
O'Driscoll, Sheckler, Van Nort

Design Criteria, Guidelines, and Requirements:

- Be creative! Think of everyday objects that can be made to make sounds at specific pitches, and consider how you might be able to control the pitch.
- The instrument must be tonal; that is, it must be capable of playing notes with clearly perceptible pitches. Simple percussion instruments do not fit this criterion, but more sophisticated percussion instruments are acceptable if they can produce perceptible pitches. For example, a snare drum would not satisfy this criterion, but a xylophone would.
- The instrument must be capable of producing all of the notes in a chromatic scale within at least one octave, and that capability must be confirmed through a demonstration. At least one team member must play part of a recognizable tune using the instrument.
- The instrument cannot use off-the-shelf (preassembled) electronic or mechanical tone generators.
- Homemade electronic instruments are allowed if the group can provide evidence that they have sufficient technical expertise to design and build it.
- Dimensions or values of component parts must be calculated deterministically using principles covered in the course as much as possible. Key dimensions that determine pitch must not be determined using trial-and-error (cut-and-try) methods, although some trial-and-error may be used to fine-tune to an exact pitch. Deterministic methods must be used to obtain the correct pitches within a semitone or so.
- Electronic amplification may be used if the instrument produces weak sounds, but it must be a supplement and not a primary part of the pitch generation method.
- Project groups are responsible for storing their projects securely until the end of the project period.
- The instrument should be robust enough to survive transport between the assembly area and the demonstration area. Exceptions could be granted for extenuating circumstances or projects that can't be moved for valid reasons.

- All group members must contribute to the success of the project. All members will complete a peer evaluation form at the end of the project. The evaluations will have a significant impact on each member's project score.
- One of the group members may keep the instrument after the project ends.

Milestones and Deadlines:

1. *Proposal:* Meet with your team and develop an initial idea that meets the criteria listed above. Think the idea through and make sure that your team can obtain the required materials and that enough members have the skills needed to assemble the instrument. Describe your preliminary design and how you plan to construct it in a 100 to 200-word proposal e-mail to me. Describe the role of each team member and the relevant skills that they will contribute to the design and/or construction effort. Your proposed project must differ substantially from the other groups' projects. The proposal is due at **11:59 pm on Monday, April 20**, although you are encouraged to submit it earlier to allow more time for design and construction or to make sure that you get your first choice of projects. You may consult with me before the deadline to confirm that your idea will satisfy the spirit of the assignment.
2. *Demonstration:* The fully assembled and operational instrument must be demonstrated to me during a 30-minute meeting at a mutually agreeable time. The following guidelines and instructions apply:
 - All group members must be present for the demonstration.
 - Meetings will be scheduled only after the proposal has been submitted and in the order that requests are received.
 - Meetings will not be scheduled during UNIV 213 lecture periods or on weekends, but meetings on weekday evenings are possible by mutual agreement.
 - By university policy, meetings will not be scheduled after the last day of the semester (May 4). It will be difficult or impossible to grant deadline extensions.
 - Meetings will not be scheduled during one or more group member's regularly scheduled lecture, lab, or recitation times for other courses.
 - The meeting will not be rescheduled if the group is not ready, the instrument fails to work properly during the demonstration, or because one or more members are not prepared.
 - If possible, meetings will be rescheduled for confirmed health issues or other extenuating circumstances.
3. **[NEW]** During the 30-minute demonstration:
 - One member of the group must briefly explain the basic operating principle of the instrument and how it produces tones at specific pitches.
 - One member must demonstrate that the instrument can play all 12 notes of a chromatic scale.
 - One member must play at least part of a recognizable musical composition.
 - Each group member must answer one or two questions about the operation of the instrument and/or the design process that your group used. The quality of the answers and the level of engagement revealed by the answers will affect that member's project score.

4. *Report*: Submit a written explanation of the principle(s) behind your instrument's operation, including design decisions and any calculations that were required to determine dimensions by **11:59 pm on Monday, May 4**. The following guidelines apply:
 - The explanation must be clearly linked to principles covered in the course.
 - The text must be word-processed.
 - Repetitive calculations may be represented by one or two example calculations.
 - Equations may be handwritten and diagrams hand-drawn if they are legible.
 - Graphs must be generated using software (spreadsheet software acceptable).
 - Composition details such as organization, grammar, word choice, and style will have a significant impact on the score.
 - The text in the report should be roughly two to three pages long. Be complete, but don't be wordy. The goal is clarity, not verbosity.

5. **[NEW]** *Peer Evaluation*: Provide an honest evaluation of the effort expended and contributions made to your project by all group members, including yourself, by dividing 100 points between you and the other members. E-mail your evaluation to me by **11:59 pm on Monday, May 4**. The following guidelines apply:
 - Ratings should reflect each individual's level of participation, effort, and sense of responsibility, not their academic ability.
 - Submission of the form two or more days late will be treated as the equivalent of a low peer evaluation score. Lateness will delay the release of everyone's scores.
 - If you assign fewer than 35 points to your partner in a two-member team, fewer than 20 points to anyone in a three-member team, or fewer than 15 points to anyone in a four-member team, you must add an explanation in your e-mail.
 - You may include additional information about your group dynamics, your ability to participate, or any other aspect of your experience.
 - **Evaluations are confidential and should be submitted individually.**

[NEW] *Scoring Criteria*:

A numerical score of 0–100 points will be assigned to each team member. The base score will be the sum of the scores achieved in the categories listed below, quantized at the indicated point levels, but it could be modified by the results of the peer evaluations and/or by late submissions of required items as explained below.

0, 10, 15, 20, 25 pts	Completeness and quality of proposal
0, 5, 15, 20, 25, 30 pts	Demonstration of functional musical instrument
0, 5, 10, 15, 20 pts	Quality of responses to questions during demonstration
0, 2, 5, 8, 10 pts	Completeness of written explanation of operation
0, 2, 5, 8, 10 pts	Quality of written explanation of operation
0, 5 pts	Exceptional creativity, originality, or analysis (“Wow” factor)

Based on the results of the peer evaluations, individual scores could be adjusted up by as much as 20 points or down to zero. Members of mostly functional groups will see no adjustment.

Each team member's score will be reduced by 5 points/day that the proposal is late and 10 points/day that the final report is late (not including weekends).