1. Introduction

For years, biology education has required the dissection of small animals to aid in understanding of physiology and anatomy. I believe dissection can aid the education of the engineer even more. A thorough understanding of the "anatomy" of an electronic product will help you in the analysis of electronics and embedded systems, but even more, it will help you in designing future products.

The goal of this assignment is the complete dissection, analysis, and reassembly of a small consumer electronics product. Each student is tasked to select an affordable, widely-available consumer electronics product to dissect and analyze. The chosen product must be *unique* and not duplicate previously dissected products (see Section 8). The product should cost no more than $15 and be available at retail outlets nationwide. It should contain digital electronics (ASIC, field programmable device, or processor), be battery powered, and safe to dissect.

2. Dissection Proposal – Due by 5 pm on January 31

Submit a dissection proposal, outlining the assembled product, price, vendor, when you expect to receive it, and your motivation for choosing this product. The proposal format is a well-organized Quad Chart or single slide (Power Point is preferred, but other common files are accepted). Be prepared to briefly present your proposal to the class in about three minutes.

3. Dissection Photo Journal

Starting with a photo of the product in unopened, retail packaging, dissect the product, taking photos at each step along the way. These photos will help others understand the manufacture and operation of the product. Furthermore, the photos will constitute a reassembly procedure.

4. Product Operation Analysis

Over the course of the dissection, determine the function of each product component. A high-level block diagram must be made for all electronic and mechanical subsystems. Details of electronics operation must be made as far as is possible, all the way to a circuit schematic with a full bill of material (BoM). Use case timing diagrams are required for each unique product operation mode.

5. Product Make-Up Analysis

A photo inventory of each unique (and removable) part must be made. Each mechanical part should be identified as to its composition and weighed. Printed circuit boards (PCBs) or other impractical assemblies do not have to be disassembled to each individual part. However, each assembly should be inventoried and a complete list of components formed. Estimations of mass for each component should be made for undissected mechanical assemblies.

6. Dissection Report – Due by 11:59 pm on April 24

Please submit a Web-based dissection report, which must contain (*at least*) the following sections/pages:

1. Introduction
   - personal introduction
   - background and motivation for choosing the product
2. Product market and retail info
   - product history
   - MSRP and street prices
   - retail outlets
   - rebranded/OEM versions
3. Dissection Photo Journal
4. Product Operation
   - human-machine interfaces
   - usage timing diagrams
5. Product Analysis
   - high-level product design diagram
   - detailed design block diagrams for electronic systems
   - tables showing expected and extreme values during operation including frequencies, voltages, current, power consumption, and battery lifetime
   - complete component-level schematics
   - complete electrical BoM (including component costs breakdown)
   - thorough non-electrical BoM (including material costs breakdown)
6. Product Reassembly (product must still work as initially designed)
7. Lessons Learned

7. Deliverables

Dissection Proposal: Submit your single-slide dissection proposal before January 31, 5 pm through Canvas.

Dissection Website: Submit your final dissection report by April 24 through Canvas. Each person must submit a dissection report in a .zip file containing (relocatable) HTML, photo files, style files, etc. Your report should begin in a file called index.html. This top-level file, all other files and subfolders must be contained in and/or below a directory xxxxxxx, which represents the 12-digit UPC code for your product. Visit the submissions from previous semesters at the class Website (see Section 8) for examples and contact the instructor if you have any questions or suggestions.

8. Dissection Examples from Prior Semesters

You can learn a great deal from previous product dissections in the Embedded Systems course:
https://courses.ece.msstate.edu/ece4723/dissect/

Some recently dissected products include:
- Electronic Hockey Game
- Poke Ball Plus Game Controller
- Motion Sensor LED Toilet Light
- Mini Arcade Game
- Garage Door Remote Opener
- Kitchen Scale
- Recordable Playback Button

- Otamatone
- Novi Smart Interactive Robot
- Bluetooth 5 Receiver
- Bicycle Speedometer
- Mechanical Keyboard
- Ivation Portable Electronic Drum Pad
- Amazon Echo Dot
- Nintendo Wii Controller
- USB Wireless Gamepad
- Electronic Handheld Slot Machine Game
- Carbon Monoxide Alarm
- ZJTL Piano Toy Keyboard
- Formvan LCD Run Step Pedometer
- Snark SN5X Clip-On Tuner
- Universal TV Remote
- Atomic Full Calendar Clock
- ReLee portable humidifier
- RCA Alarm Clock
- Rowin High Precision Guitar Tuner Pedal
- Submersible LED array
- ROSENICE Electronic Remote Control Plush Mouse
- Mr. Beams Infrared Pathlight
- SNAPTAIN H823H Mini Drone
- Tile Mate
- M310 Logitech Wireless Mouse
- Wacom Firetruck
- Bop-It Mini
- Wired Controlled for Nintendo Switch – Game Cube
- Solar Power Bank
- RC Car
- Camkix Bluetooth Selfie Remote
- ReliOn Digitial Thermometer
- 20Q children's toy
- Korg CA2 Chromatic Tuner
- On-Board Diagnostics Port Scanner for cars
- Bluetooth Keyboard
- Mini Speaker
- Nokia 105 cellphone
- TP-Link WiFi Smart Plug
- TP-65 Thermometer
- Senmod Long Distance RF Switch Transmitter and Receiver
- Sky Viper S1750 Drone
- Etekcity Lasergrip 1022/774 Non-Contact Digital Infrared Thermometer
- Flash Drive/mp3 Player/Radio
- NooElec RTL-SDR
- MainStays Slimline Digital Scale
- Amazon Fire TV Remote
- Scosche Universal FM Transmitter (FMT4S)
- Inkbird ITC-1000 temperature controller