**ALL MODIFICATION AND MISSING POINTS ADDED STARTING PAGE 4**

**Client Feedback:**

* The client expressed a need for simplicity and ease of operation, particularly emphasizing that the device should require minimal force to operate.
* Critical for the device is its ability to be used comfortably with one hand, considering the client's limited functionality on the other hand.
* The client appreciated elements from all presented concepts and is interested in a hybrid design that integrates the best features into a seamless, functional unit.
* The client expressed has expressed a preference for having a mold of her hand.
* The client described her need to have the ability to use both sides of the nail file, hence, to have a mechanism which allows the user to easily readjust the nail file.
* The client also mentioned the importance of being able to file her nails from the bottom and being able to have clear visibility of her movements; having a mechanism in which her hand is positioned upwards.
* The client wants full control of her nail file; does not want an electric nail file.
* The client has expressed a need for a not too bulky device that allows her to easily file around her nails.

**Required Design Adjustments:**

* **Single-Hand Operation:** The device must be designed to allow all operations, including loading to be performed with one hand.
* **Ergonomics and Weight:** The design should focus on being lightweight to minimize strain and it doesn't need to be ergonomic because the client doesn't care about comfort.
* **Integration of Preferred Features:** Features like the grip style, activation mechanism, and material choice from the various concepts should be combined in a harmonious and functional manner.

### **2. Detailed Design Update**

#### **a. Physical Prototypes**

* **Visual Representation:** We develop detailed 3D models using CAD software (SolidWorks), presenting a streamlined profile that minimizes physical bulk while maintaining structural integrity. The model demonstrates the integration of components such as the handle, lever system, and container.

### **Detailed Preliminary Bill of Materials (BOM)**

#### **1. Handle Assembly:**

* **Custom Parts**:
  + Description: The parts used for the handle assembly will be custom made and 3D printed using an AnyCubic Photon Mono M5s resin printer.
  + Material: AnyCubic ABS-Like Resin Pro 2
  + Source: Amazon
  + Cost: $39.99 (1000 mL)
  + Quantity: 1
  + Link: Amazon - [https://www.amazon.ca/ANYCUBIC-Toughness-UV-Curing-HighSuccessPhotopolymer/dp/B0CJ2FP5ZR/ref=asc\_df\_B0CJ2FP5ZR/?tag=googleshopc0c20&linkCode=df0&hvadid=683221985005&hvpos=&hvnetw=g&hvrand=3249169428822237820&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000717&hvtargid=pla2298964755495&mcid=03551c0ea2a93ceaadd77364dcbd6ea0&gad\_source=1&th=1](https://www.amazon.ca/ANYCUBIC-Toughness-UV-Curing-HighSuccessPhotopolymer/dp/B0CJ2FP5ZR/ref=asc_df_B0CJ2FP5ZR/?tag=googleshopc0c20&linkCode=df0&hvadid=683221985005&hvpos=&hvnetw=g&hvrand=3249169428822237820&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000717&hvtargid=pla-2298964755495&mcid=03551c0ea2a93ceaadd77364dcbd6ea0&gad_source=1&th=1)

#### **2. Fasteners:**

* **Cyanoacrylate Glue**:
  + Description: Adhesive we will use to join 3D printed plastics.
  + Source: Amazon
  + Cost: $9.97 (15 g)
  + Quantity: 1
  + Link: Amazon – https://www.amazon.ca/Gorilla-Fast-Setting-Controlled-Cyanoacrylate-112441/dp/B0BZ9YWN35/ref=asc\_df\_B0BZ9YWN35/?tag=googleshopc0c20&linkCode=df0&hvadid=578815767342&hvpos=&hvnetw=g&hvrand=15601281954888956477&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000717&hvtargid=pla2255129543927&psc=1&mcid=73bd5fc73d2b3473ab3e8f9ee2f7ea9b
* **Screws**:
  + Description: For assembling structurally important 3D printed components.
  + Type: Witlans Phillips flat head self-tapping screws assortment kit
  + Material: Stainless steel
  + Dimensions: M2 M3 M4/ 15 sizes
  + Source: Amazon
  + Cost: $16.99 (460 Pcs)
  + Quantity: 6
  + Link: Amazon - <https://www.amazon.ca/Witlans-Self-Tapping-Assortment-StainlessCountersunk/dp/B08G52RSBL/ref=sr_1_1?crid=2UTVPRMP970FI&dib=eyJ2IjoiMSJ9.6Ck4PcFbbf2QvFI2z7p5cQ._oRX1q4hiSYQe6A2aLiOrVQqGO7RWWgvgCiQzKYFK00&dib_tag=se&keywords=philips+460pcs&qid=1717627581&s=hi&sprefix=phillips+460pcs%2Ctools%2C70&sr=1-1>
* **Magnets**:
  + Description: Used for the file locking mechanism.
  + Type: Neodymium magnets
  + Dimensions: 3 x 1 mm
  + Source: Amazon
  + Cost: $14.92 (300 Pcs)
  + Quantity: 2

Link: Amazon - <https://www.amazon.ca/300pcs-3x1mm-Magnets-Magnets-Mini-Miniatures/dp/B0BYSDJRG8/ref=sr_1_2_sspa?dib=eyJ2IjoiMSJ9.nfUGkWUdbiBE1bIg1KwGfkCMH148I52A6E3tOtiDQKaOulh8xIgPQw4wS8uFm1vxO3htasJDA1DdRRhEsG7m0XUbxrvshM_iu29nvIkNAxNdRolGW1yfiuiqc1oQLdaD8M4xJy8PFscs9vCYgu0RwJEPqz87E51t20uf_vdt1arZt4gxo9QEZllSLmv9h9RYJLI_dYRmD_FppIlnSrt4gvI1X1obNWtdMKPgv5W3sJWULYrXz1zaw55rOqLDCdl_uz9L7ps2b4oW6YeU0_LNdpf_ZrKCVDS2X_WE0mp4.CvvP5dy8H69n1rXZBrFvlUdnv0Tt3Kq4DmouXi2JPw&dib_tag=se&hvadid=667162476842&hvdev=c&hvlocphy=9000717&hvnetw=g&hvqmt=e&hvrand=12565354048211767719&hvtargid=kwd294913616816&hydadcr=23311_13656862&keywords=small%2Bneodymium%2Bmagnets&qid=1717637630&sr=8-2-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9hdGY&th=1>

**Estimated Total Cost:** We have calculated $81.87 in raw materials and components. Our device will only use 0.10$ worth of magnets and 0.22$ worth of screws. However, we have not yet determined how much resin will be necessary to build the components. Therefore, the product cost currently undetermined.

**Skill:**

**Available Skills:**

1. **Engineering Skills:**
   * Our team members possess strong engineering backgrounds, as evidenced by the ability to create high-fidelity prototypes using SolidWorks, physical prototype and conduct various assembly tests.
   * Skills in 3D printing (filament and resin printers) are well-developed, facilitating rapid prototyping and iteration.
   * Knowledge of materials such as ABS-like resin and neodymium magnets is utilized for designing functional and durable components.
2. **Marketing and Administrative Skills:**
   * All Team members have capabilities in developing a business model canvas, indicating an understanding of market strategies and administrative tasks required to run a business.

**Missing Skills:**

1. **Advanced Manufacturing Knowledge:**
   * The team acknowledges a lack of resources and knowledge for managing complex shapes in upcoming prototypes, particularly for the hand stabilizer.
   * Expertise in advanced manufacturing techniques and materials.
2. **Financial Analysis Skills:**
   * We lack expertise in creating detailed financial models, including income statements and Net Present Value (NPV) analysis.

**Mitigation Strategy:**

* **Training and Workshop:** Go to workshops with Makerspace .
* **Hiring and Consultation:** Engage with external consultants or hire individuals with financial analysis expertise.
* **Collaboration:** Partner with universities or research institutions for access to advanced manufacturing knowledge and resources.

**Resources:**

**Available Resources:**

1. **Engineering and Prototyping Tools:**
   * Access to filament and resin 3D printers for prototyping. (Makerspace)
   * A variety of materials including ABS-like resin and neodymium magnets.
2. **Human Resources:**
   * TA, prof, project manager and Makerspace technicians.
   * Collaboration with manufacturers and retail partners.

**Missing Resources:**

1. **Advanced Manufacturing Facilities:**
   * Lack of facilities for complex manufacturing beyond the scope of current 3D printing capabilities (hand stabilizer).
2. **Financial Resources:**
   * Insufficient funding for scaling up production and marketing efforts.

**Mitigation Strategy:**

* **Money:** Make sure of the bill foundation and include marketing.
* **Facility Partnerships:** Establish partnerships with advanced manufacturing facilities

**Time**

**Available Time:**

* The project timeline includes several upcoming prototypes, suggesting a structured development schedule in the Gant chart.

**Time Constraints:**

* The need for continuous iteration and testing but must be before design day
* **Resource Allocation:** Prioritize critical tasks and allocate sufficient resources to meet deadlines.

### **Critical Product Assumptions**

1. **Market Demand:**

* Assumes a sufficient market demand for the product based on preliminary market research.
* **Production Costs:**
  + Assumes production costs will decrease with higher volumes. This needs validation through detailed cost analysis and scaling studies.

1. **User Acceptance:**
   * Assume users will find the product accessible and easy to use. Continuous user feedback and iterative design improvements are necessary to meet user expectations.

**GANTCHART:**

**FIND BELOW**

