

Basic Soldering



By:
Group Z11

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Soldering Overview

“Soldering is a joining process used to join different types of metals together by melting solder.” - TWI

Unique Properties

- All hardware
- Easy to grasp
- Hard to master

Content of Presentation

- Define
- Ideate
- Client Feedback
- Prototype 1
- Future Work



Design Criteria

Client Statement	Importance
Provide an introduction to soldering tools and steps	0.2
Online solution simulates accurate real world soldering	0.125
Students attending the workshop will spend a maximum of \$20 on the tutorial	0.05
Open source tutorial	0.15
The tutorial answers common questions	0.175
The tutorial contains steps of the real workshop	0.1
The tutorial include a hands-on section	0.15
The online workshop will be around 90 minutes	0.05



Target specifications

#	Target Specification	Marginally acceptable value	Ideal value
1	Length of workshop in term of time.	40 < minutes < 80	60 minutes
2	Effectiveness	70%~90%	100%
3	Rating	~3.5/5	5/5
4	Accuracy	~3.5/5	5/5

Benchmarking

Interpreted Needs	Weightings		Does it satisfy the need?	
	Course 1: Udemy	Course 2: CIE Bookstore	Course 1: Udemy	Course 2: CIE Bookstore
Provide an introduction to soldering	0.2	0.2	Yes, but requires some experience in basic electronics	Yes
Online solution simulates them soldering	0	0	No	No, but it gives you the tools to solder in real life
Students attending the workshop will spend a maximum of \$20 on the tutorial	0.05	0	Yes (Currently On Sale for \$16.99)	No
Open source tutorial	0.15	0.15	Yes	Yes
The tutorial answers common questions	0	0.175	No	Yes
The tutorial contains steps of the real workshop	0.1	0	Yes, Similar to what the client described	No
The tutorial includes a hands-on section	0	0.15	No	Yes
The online workshop will be around 90 minutes	0.05	0.05	Yes	Yes, (Estimated)
Total	0.55	0.725		

Decision matrix

Interpreted Needs	Weightings			Does it satisfy the need?		
	Online course	Soldering kit	Game	Online course	Soldering kit	Game
Provide an introduction to soldering	0.2	0.2	0.2	Yes	Yes	Yes
Online solution simulates them soldering	0.125	0.1	0.125	Yes	No, but it gives you the tools to solder in real life	Yes
Students attending the workshop will spend a maximum of \$20 on the tutorial	0.05	0	0.05	Yes	No	Yes
Open source tutorial	0.15	0.05	0.10	Yes	No	Depends on requirements
The tutorial answers common questions	0.175	0.175	0.175	Yes	Yes	Yes
The tutorial contains steps of the real workshop	0.1	0.1	0.1	Yes	Yes	Yes
The tutorial includes a hands-on section	0.125	0.15	0.15	Yes, but less so	Yes	Yes
The online workshop will be around 90 minutes	0.05	0.05	0.05	Yes	Yes	Yes
Total	0.975	0.875	0.95			

Concepts

Online course

- Video introduction with text
- Interactive section
- Quiz

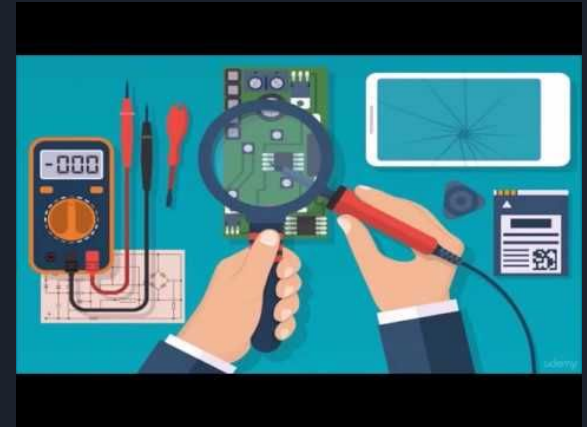


Soldering kit

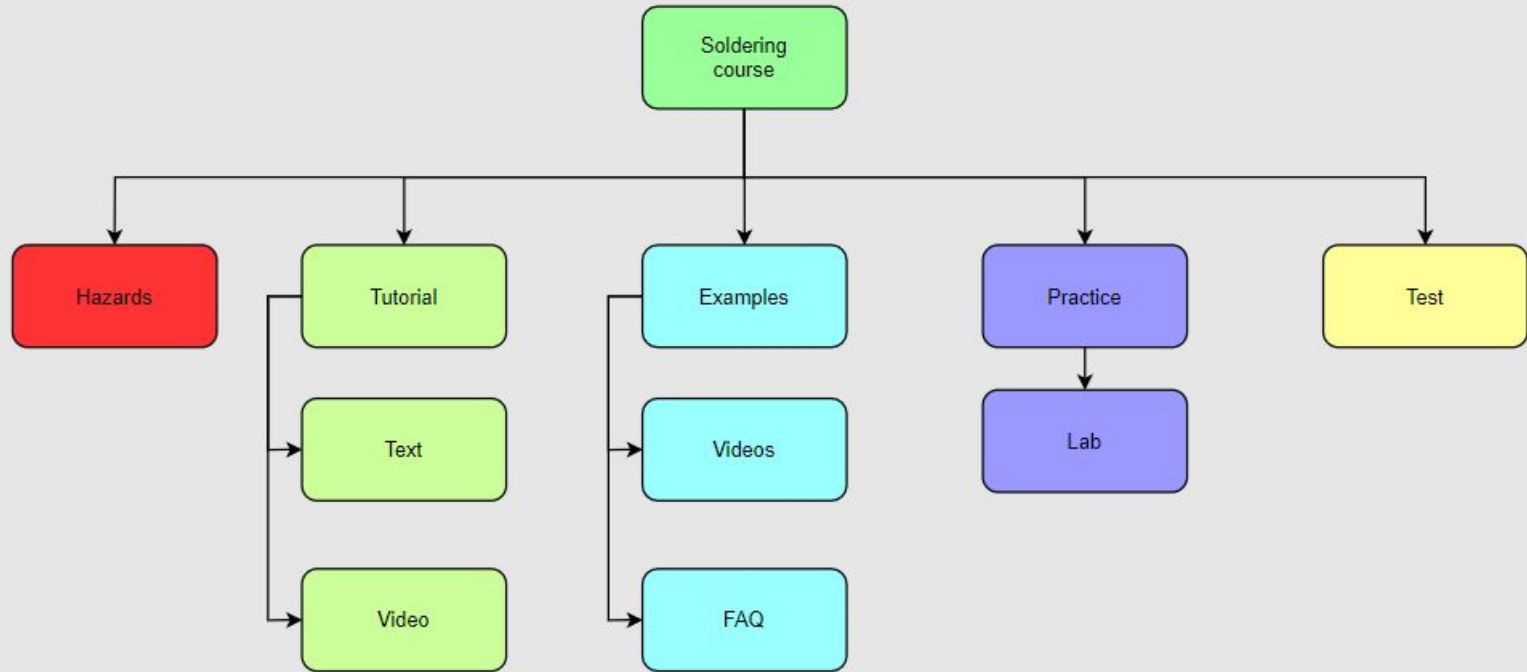
- Using real soldering iron
- Text or video instructions
- Have to pay

Game

- In-game tutorial
- Soldering simulation
- Practical soldering test



Functional decomposition





Bill of Material (BOM)

#	Name	Description	Quantity	Unit Cost (CAD\$)	Extended Cost (CAD\$)
1	Soldering set	A set of items related to soldering https://assetstore.	1	4.99	4.99
2	Unity	Software for creating games	4	0	0
3	Github Pages	Website hosting software	1	0	0
4	Weebly	Website hosting software	1	0	0
5	Zoom	Chat room application	1	0	0



Feasibility study

Technical: Does your team have enough expertise and technical resources?

- Our solution is entirely based in software, however our team is comfortable and experienced in programming, as well as having experience with Unity.
- All platforms (Unity, Weebly/Github) involved are entirely free to use and easily accessible by the user base.

Economic: Can the cost of your project be reasonable?

- Our product will be a free to use online workshop, using free platforms, meaning there is no cost to the user. The only cost to the client are the assets purchased for our game section.
- The soldering kit section is an optional aspect, for users who want to continue developing their soldering, meaning it will only cost those who choose to purchase the kit the price of materials, and will cost the average user and the client nothing.

Legal: Are there any legal issues with releasing your solution to the public

- As long as Weebly and Unity's terms of services are respected, which shouldn't be an issue, we have no legal issues with releasing our solution to the public.

Operational: Are there any organizational constraints that will prevent your success

- The only potential constraint is the fact that our team is in school, so team meetings and project work can sometimes be restricted by school schedules, but that's a minor constraint.

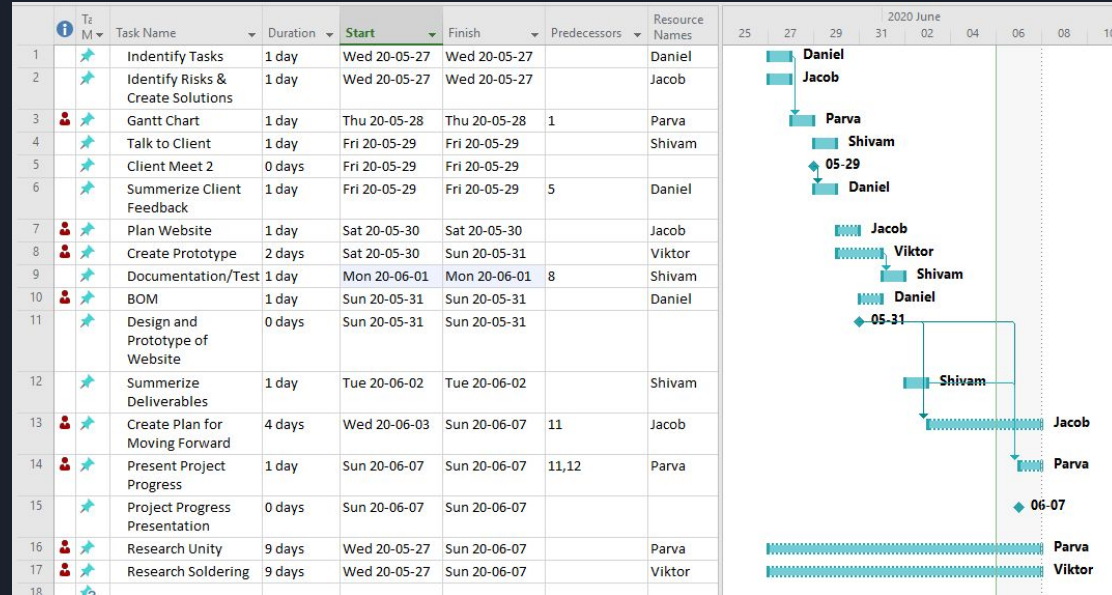
Scheduling: What are the deadlines and are they reasonable for your solution

- July 17th is when we will be presenting the client the final product.
- The rest of our deadlines are outlined QQ

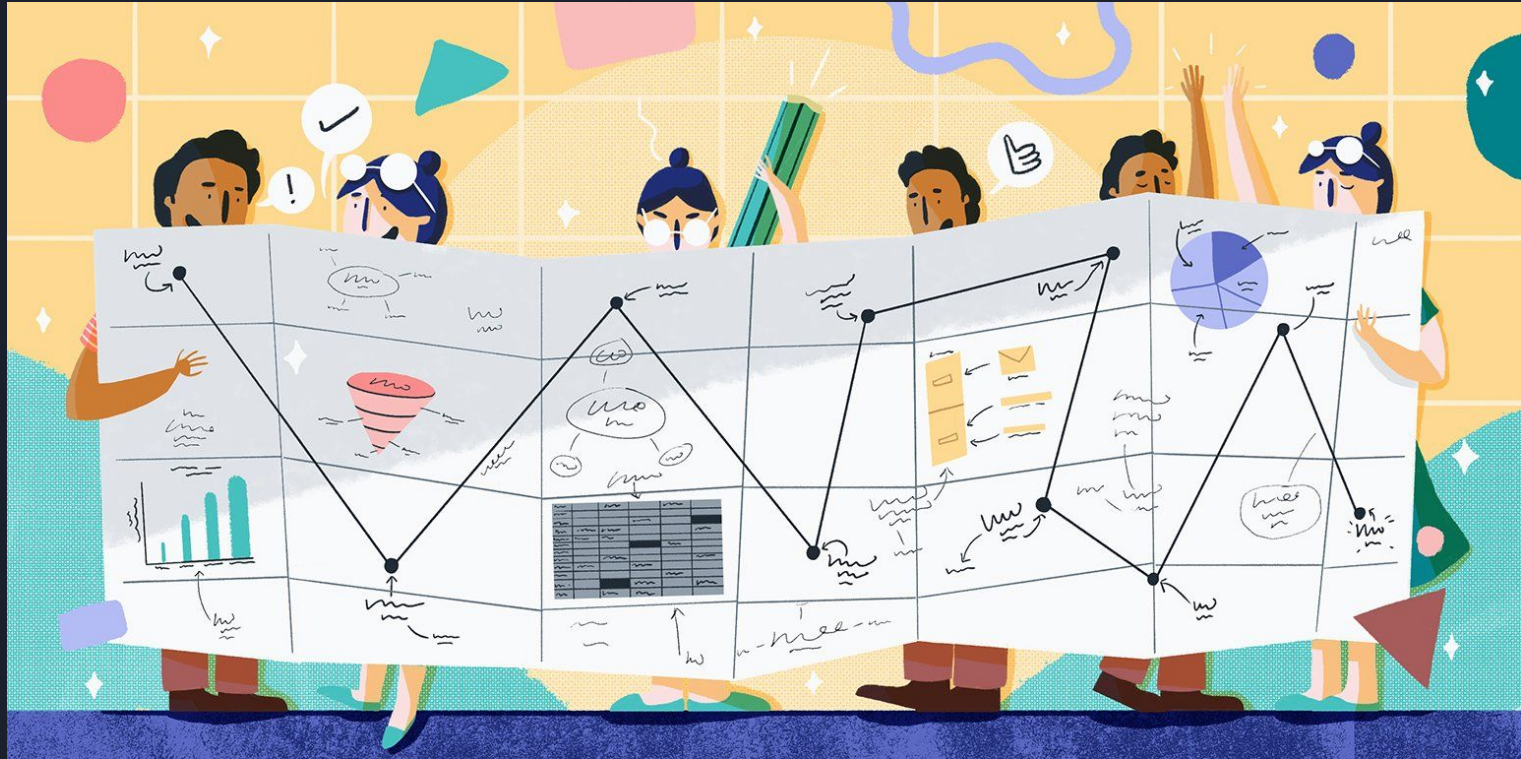
Prototype development plan

Project management skeleton

Task	Owner	Date
Client meet 1 preparation	Everyone	May 10
Client meet 1	Viktor	During Lab in week2
Needs identification and product specification	Jacob	May 17
Conceptual design, project plan and client meet 2 preparation	Daniel	May 24 (peer assessed)
Client meet 2	Shivam	During Lab in week 4
Detailed design and prototype 1	Shivam	May 31
Project progress presentation and client meet 3 preparation	Parva Pathak	June 7 (peer assessed)
Client meet 3	Jacob	During Lab in week 7
Prototype 2 and customer feedback	Daniel	June 21
Design day and final prototype	Everyone	July 17
User manual	Everyone	July 19



Initial project plan



Hazards on Soldering

Text + Video

Brief

Short

Required

Physical Hazards

Noise

Moving
machinery
accidents

Projectiles

Heating
devices

Slipping



Tutorial

- Texts
- Introduces tools
- Example

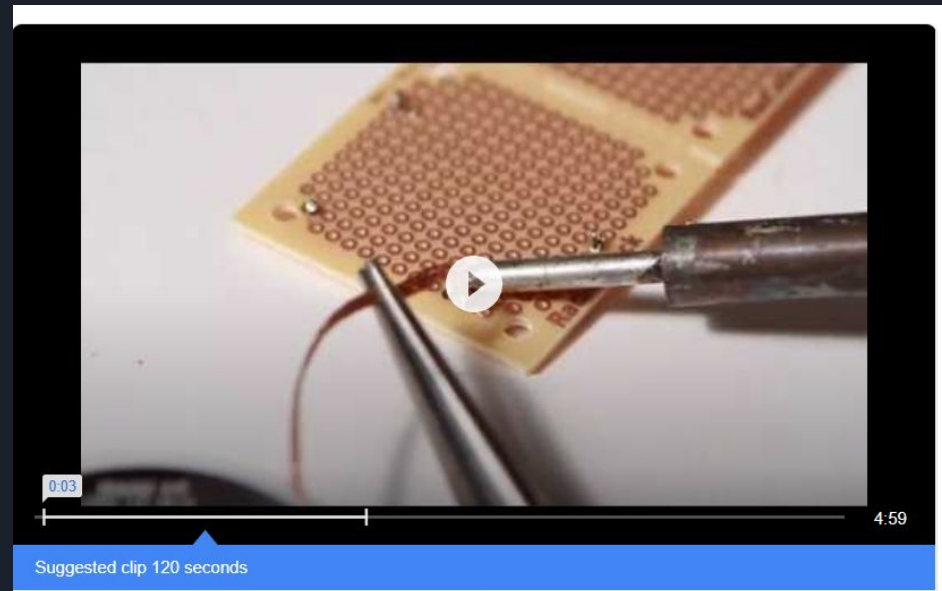
- Videos
- Examples

This write-up is designed to introduce the basics of soldering.

- after reading this material, you'll take an online quiz
- after passing the online quiz, you will schedule hands-on instruction
- once you are comfortable, you will take a hands-on exam
- after you successfully pass the exam, you will be able to use the basic soldering equipment and materials

SOLDERING DOESN'T HAVE TO BE DIFFICULT!

With the amount of time EE and CS students will likely spend soldering, investing 5 minutes to read through this could save you countless hours of frustration at the bench.



Lab

2D game

Real physics

Accurate

Introduce:

Tools

Steps

Hands-on practice

Required



Soldering kit

Optional

Physical tools

Hands-on practice



1. Soldering Station & Iron



Test

Ensure skills

Option to go back

Knowledge

Safety

Ph.D (Management Sciences) Sample Test Paper

The Entrance Test will comprise of on-line multiple choice questions (MCQs). You will select one answer from four choices. Total time duration is 90 minutes. 10 questions will be asked from each of the following areas.

1. Business Communication
2. Finance and Accounting
3. Management
4. Economics
5. Marketing
6. Mathematics and Statistics
7. Management Information Systems (MIS)

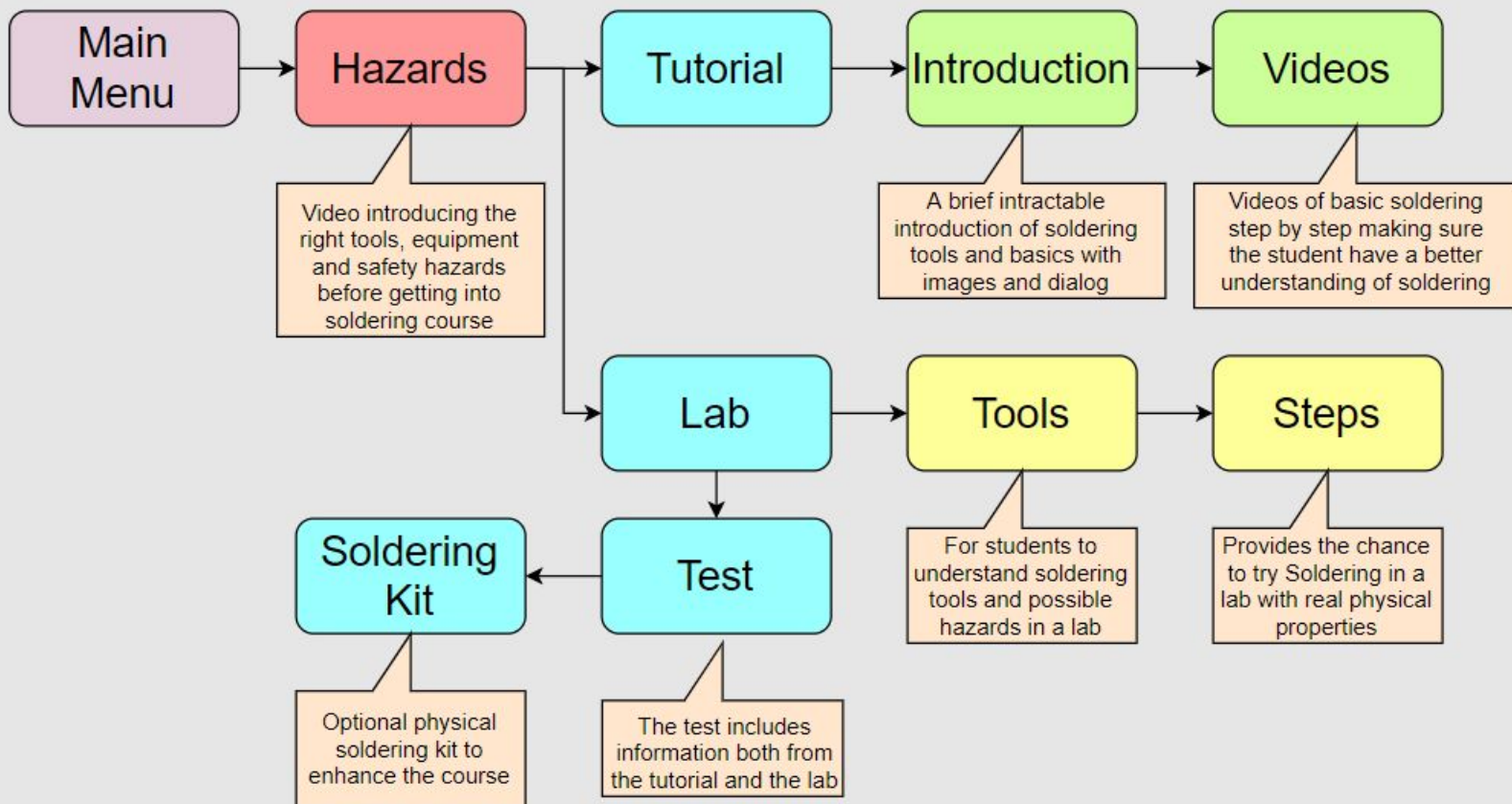
SECTION I - BUSINESS COMMUNICATION

1. Which of the following is the most effective way to encourage ethical behavior in your organization.
 - a. Clearly laying out expected behavior in a written policy or code of ethics
 - b. Making sure top management set clear examples of ethical behavior
 - c. Punishing those who act unethically
 - d. None of the above

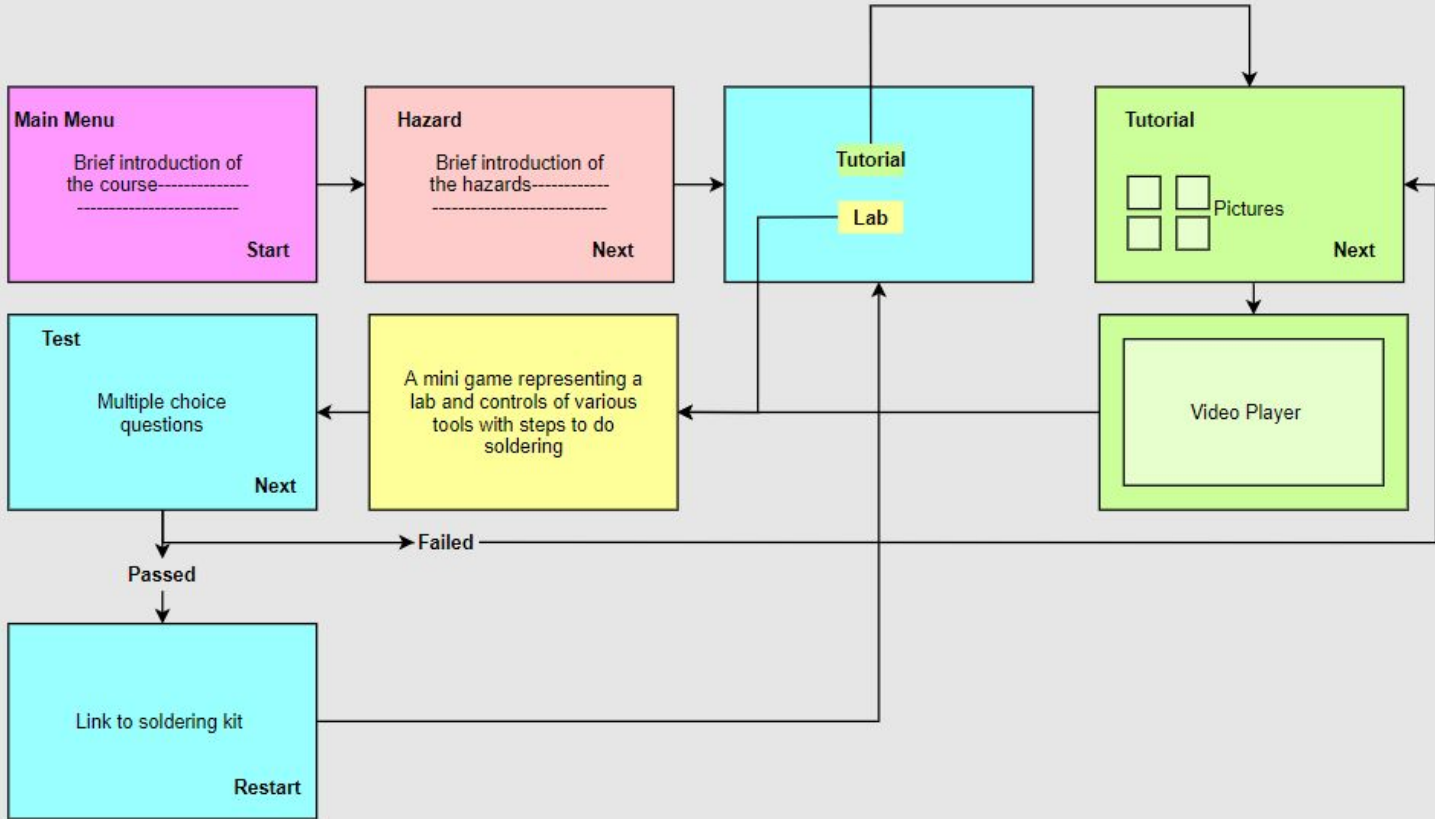
SECTION II - FINANCE AND ACCOUNTING

1. Legitimate measures taken by management to make a business look as strong as possible at the balance sheet date is called:
 - a. Objectivity Principle
 - b. Window dressing
 - c. Cost Principle
 - d. None of the above
2. DuPont Analysis is the combination of the following two ratios:
 - a. Profit Margin x Total Asset T/O
 - b. Profit Margin x Current Asset T/O
 - c. Net Income x Fixed Asset T/O
 - d. None of the above

Soldering Online Course Diagram



Soldering Online Course Diagram

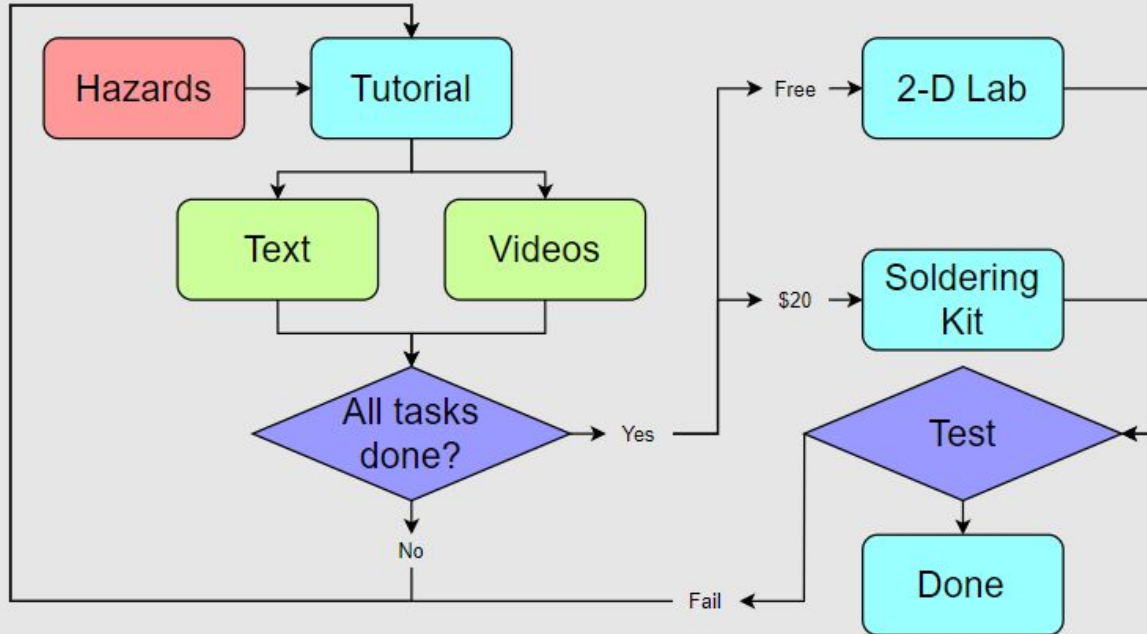


Client Feedback

- Practice
- The soldering kit expensive
- FAQ
- Interactions
- Zoom call



Soldering Online Course Diagram



Additional Features

Uttawa theme

Forum

Score board

Additional labs

Zoom

FAQ



Current Prototype Overview

<https://solderingcourse.weebly.com/>

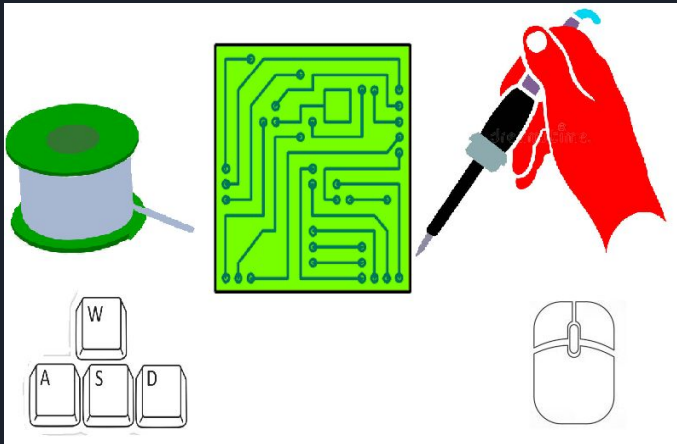
Future Work


Prototype 2

- Unity
- Github pages
- Focused high fidelity

Important Factors

- Practice is essential
- Options for students
- Communication tool





Work Cited

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