CIS 6930 Topics in Computing for Data Science
Week 13: Presentation Session 2

Tue 11/30/2021
Yoshihiko (Yoshi) Suhara

Timekeeping

- **5 minutes**: Ding
  - Please wrap up the talk
- **8 minutes**: Ding Ding
  - Let's wrap up the QA & discussion

Project Report Submission Guideline

Project Report (due Tue 12/7)

!

The project report must contain

- 1) Motivation
- 2) Clear problem definition + related background
- 3) Methodology: Description of the solution/baselines and the dataset
- 4) Evaluation: Results and Discussion
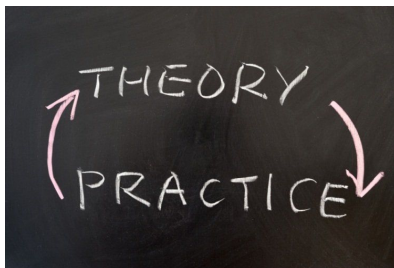- 5) Personal reflection: Challenges encountered, lessons learned

Submit the following files to the Canvas

- Project report (PDF)
- Codebase
- Presentation slides (PDF)

Final Remarks

Theory & Practice

- Theory & practice
  - i.e., lectures + hands-on session/assignments/term projects
  - My focus is to teach **Why? (Theory)** and **How? (Practice)**

Big Picture: Deep Learning as Building Blocks

- **(A) Model Architecture + (B) Training Strategy + (c) Data**

We have worked on them

Model Architecture

Multi-layer Neural Networks

AutoEncoders

Convolutional Neural Networks

GANs

Recurrent Neural Networks

Transformers

+

Training Strategy

Batch Sampling
Optimizers: SGD, Adam
Learning Rate Scheduler
Dropout Regularization
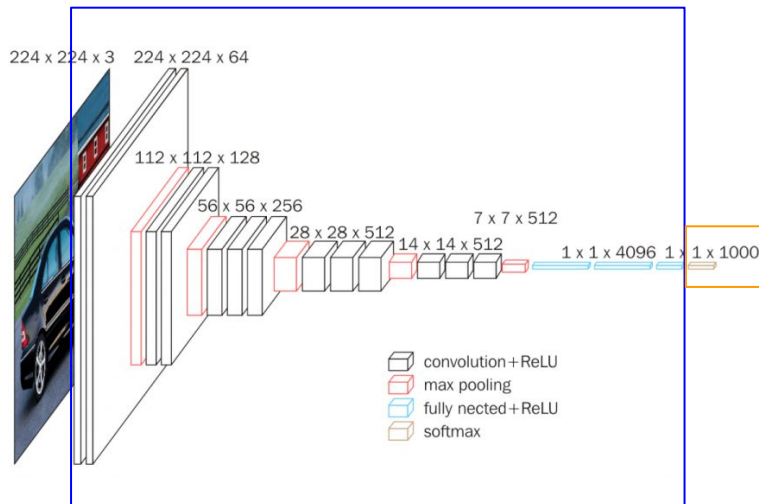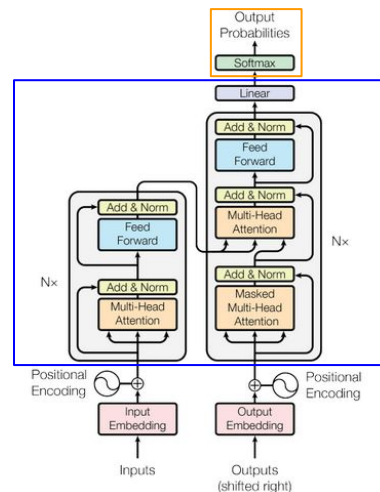Layer/Batch Normalization
Early Stopping
Data Augmentation

+

Data

Always Remember Basics

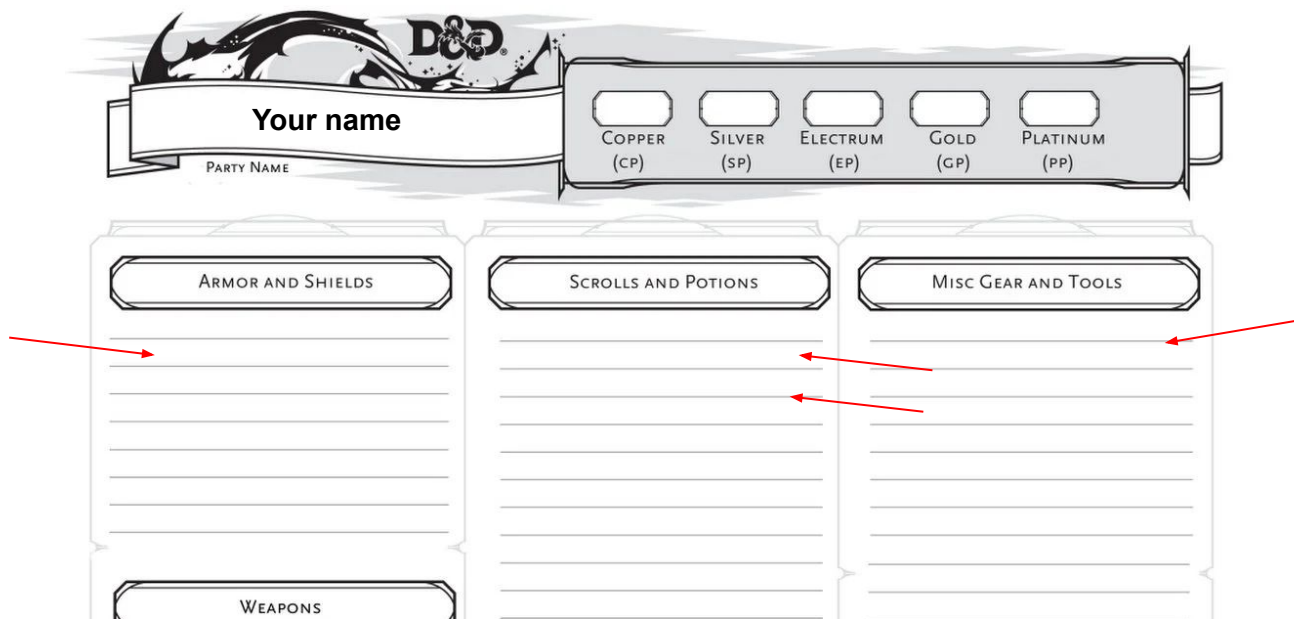- Deep NN = **Representation extraction** + Linear/Logistic Regression

VGG 16

Transformer

You Have Obtained Armors/Weapons/Magic Spells!!

- Ready to beat monsters (i.e., problems)!

Data Science in Real Life

Humans Are "Still" Stakeholders

- Humans use Machine Learning models and make the final decision
- Objective function != KPI or KGI

How much **profit** will it make? How much will it **cost**?

I built a model that achieved **80% accuracy**!

Humans Are "Still" Stakeholders

- Humans use Machine Learning models and make the final decision
- Objective function != KPI or KGI

I built a model that achieved **80% accuracy**!

Humans Are "Still" Stakeholders

- Humans use Machine Learning models and make the final decision
- Objective function != KPI or KGI

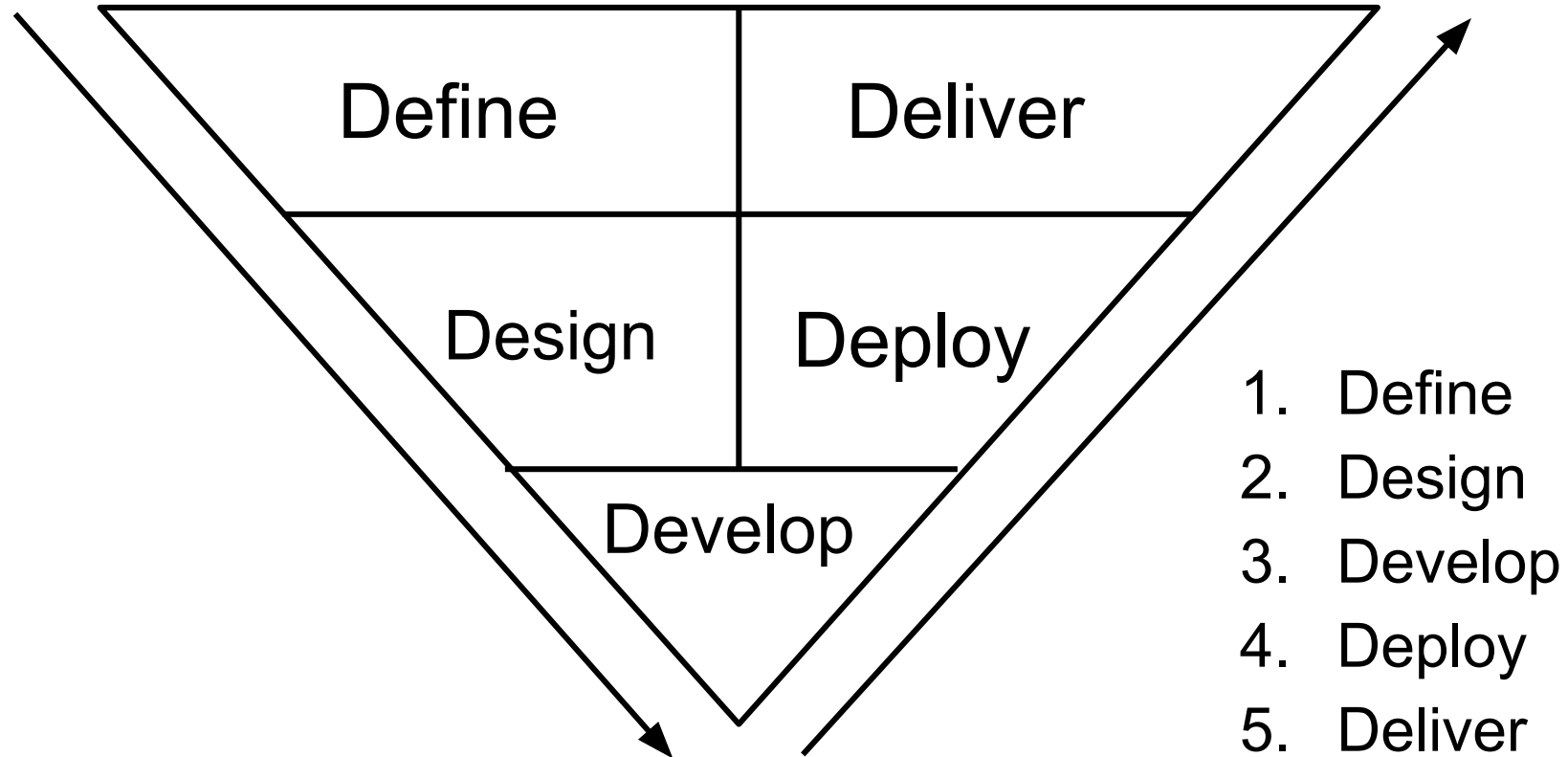How much **profit** will it make? How much will it **cost**?
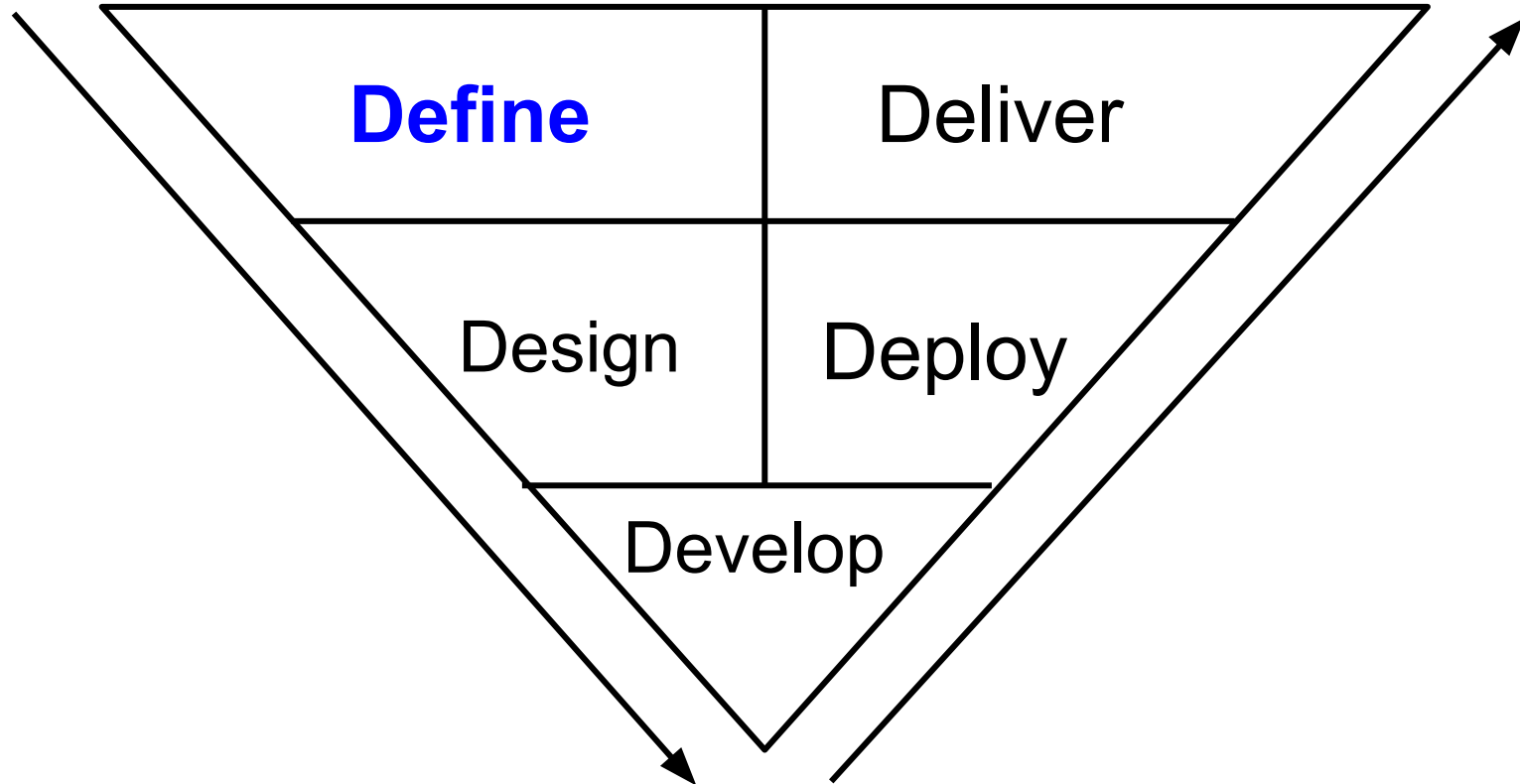
I built a model that achieved **80% accuracy**!

Well....

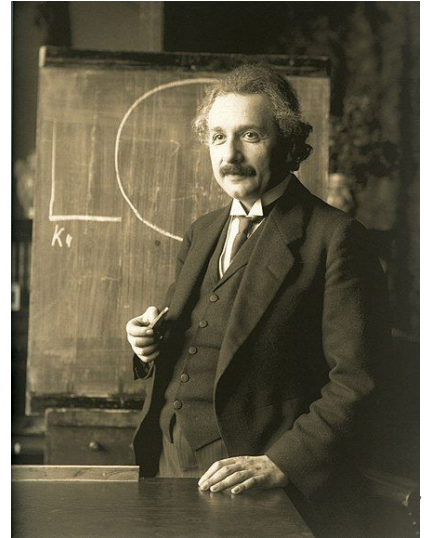# Humans Are "Still" Stakeholders

- Humans use Machine Learning models and make the final decision
- Objective function != KPI or KGI

Five Essential Ds in the Data Science Project
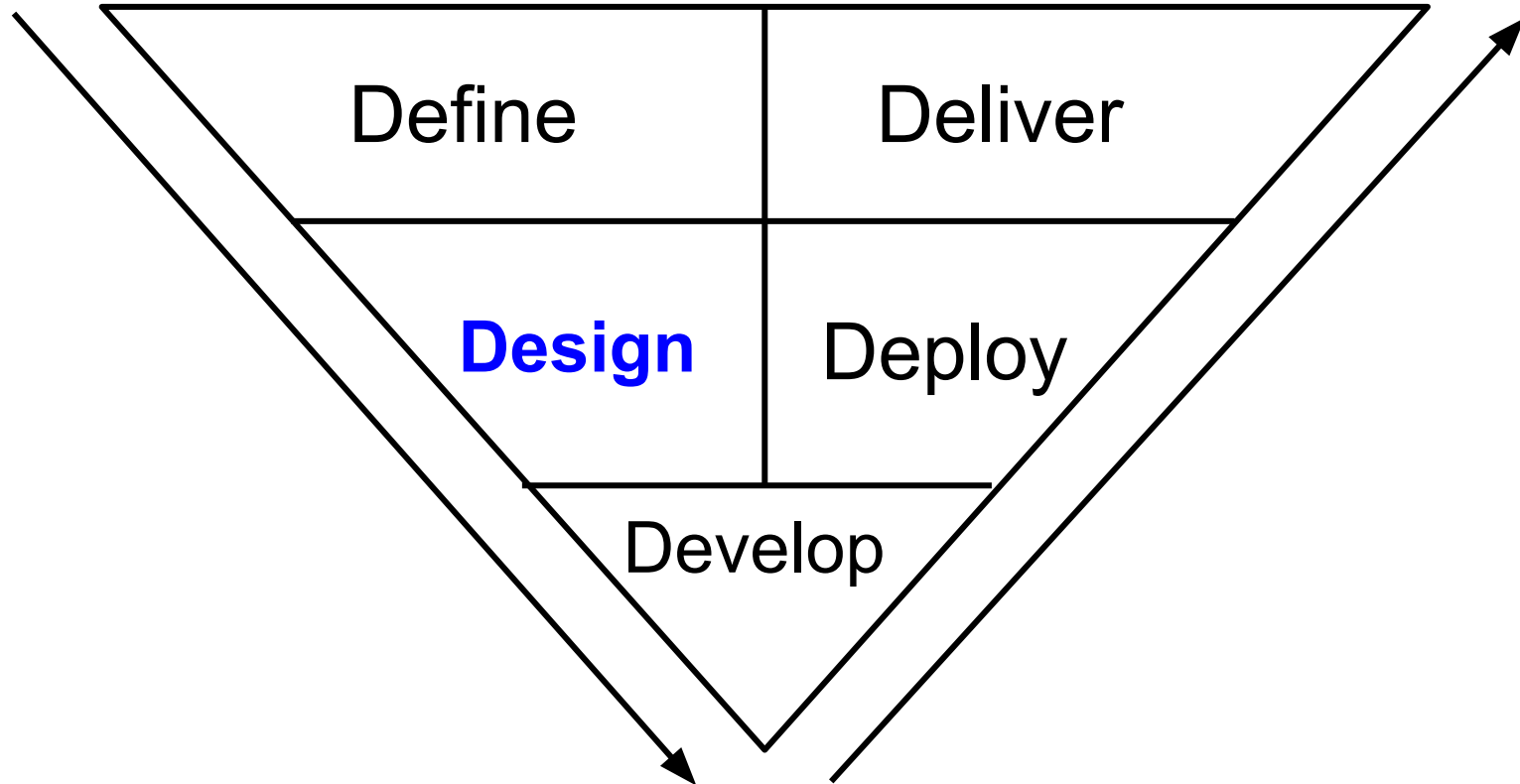

1. Define
2. Design
3. Develop
4. Deploy
5. Deliver

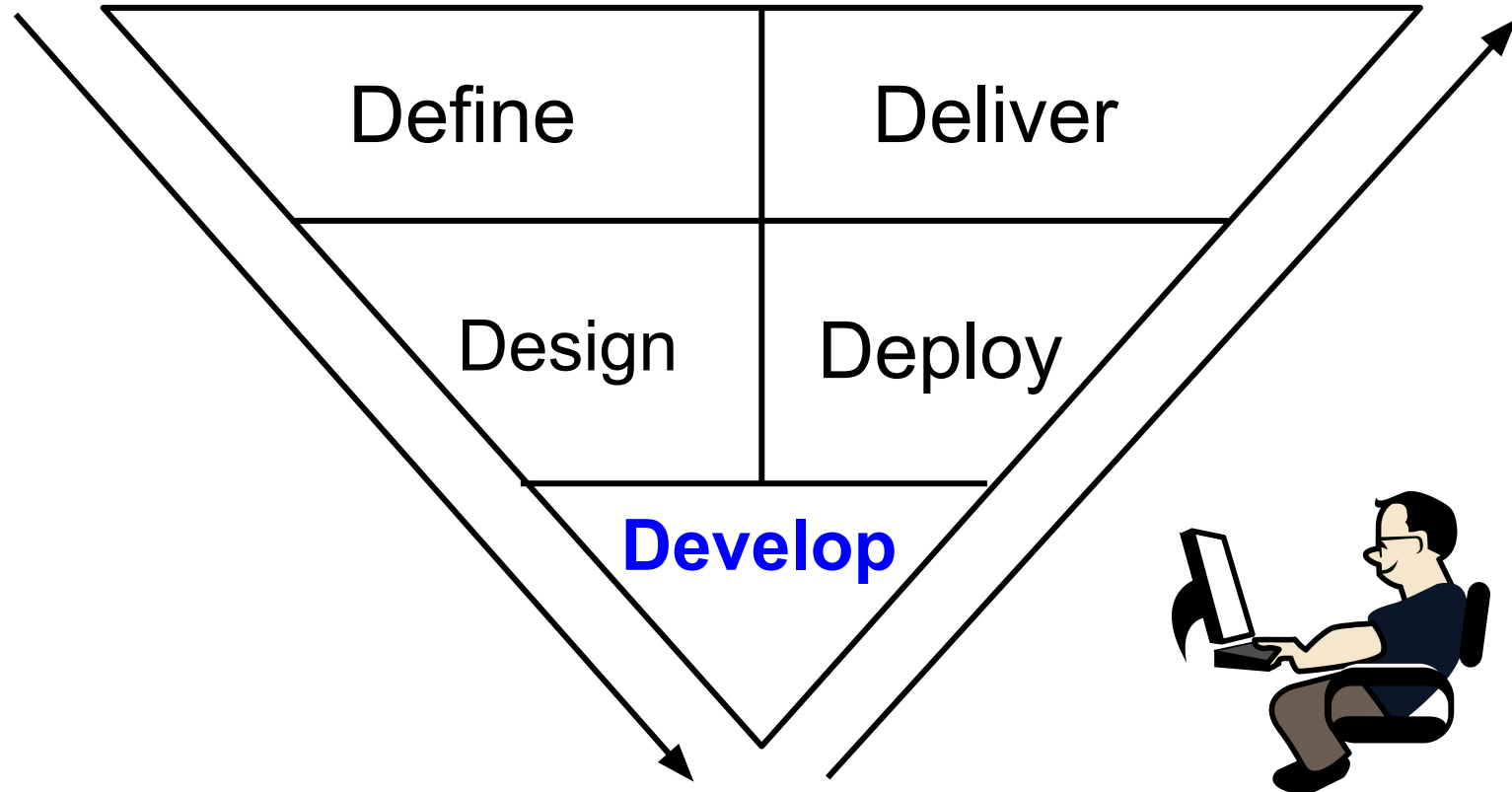# Define: Decide What to Solve & Formulate the Problem

**"I would spend 55 minutes defining the problem and then 5 minutes solving it."
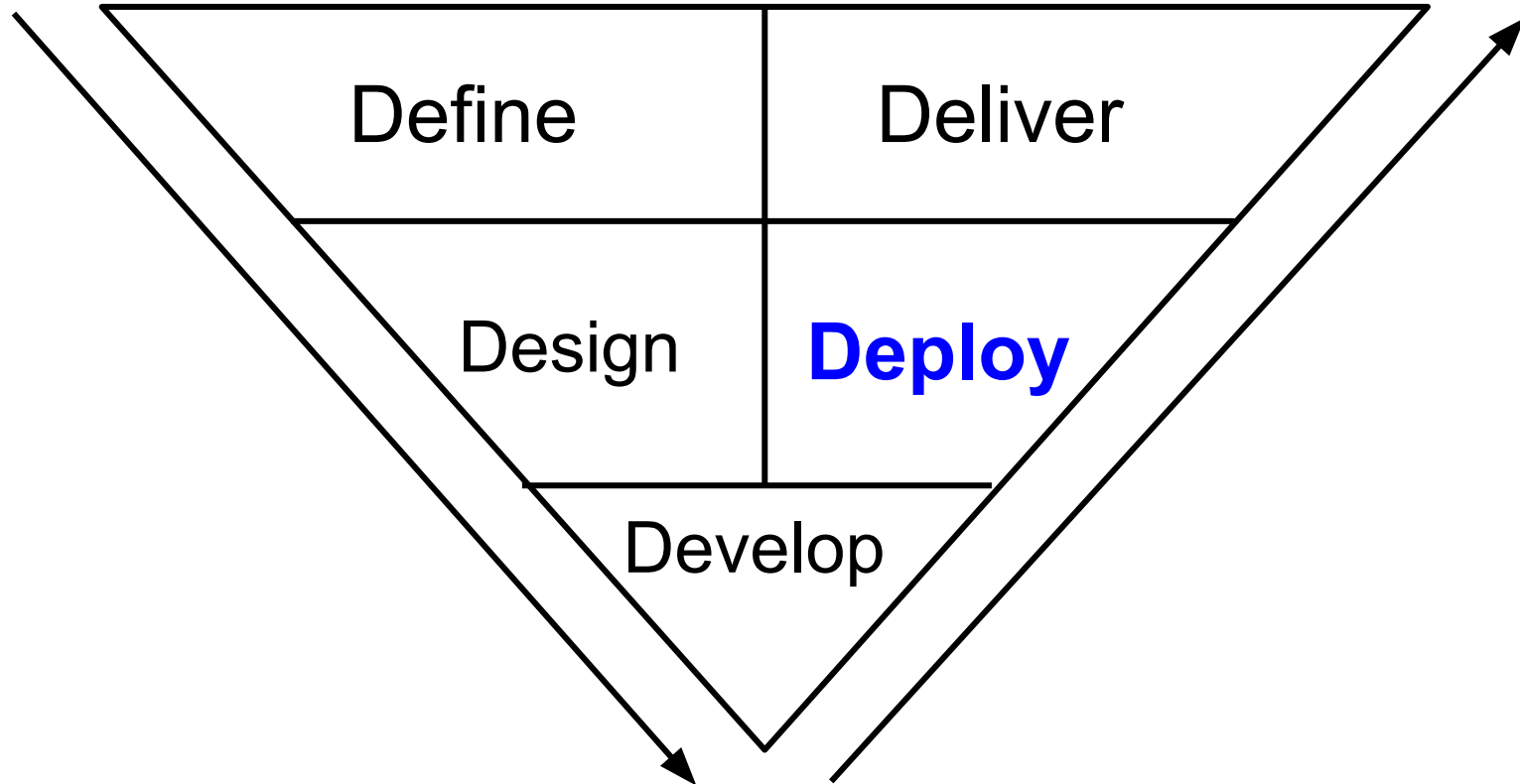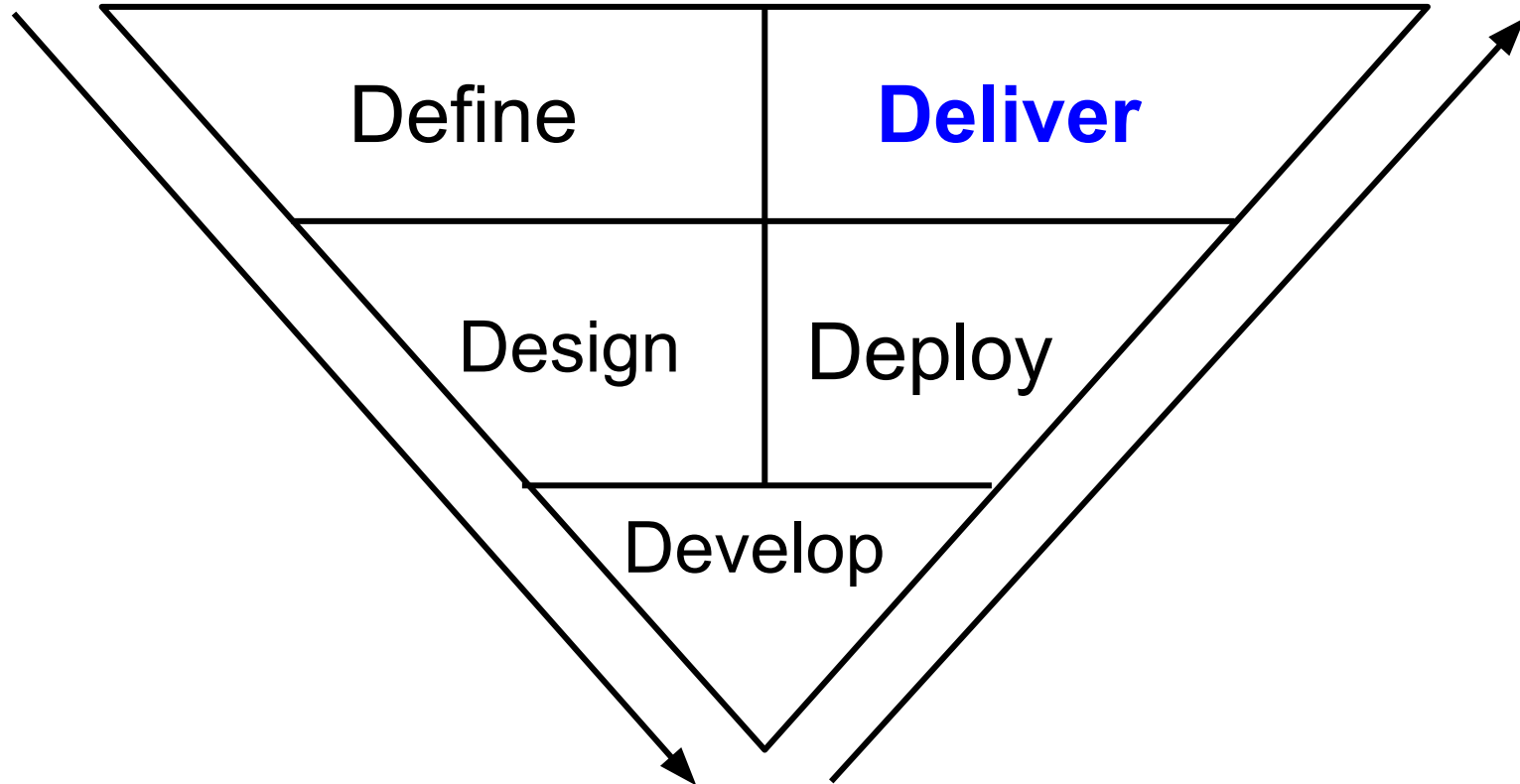- Albert Einstein**

Design: Design the System & Algorithm
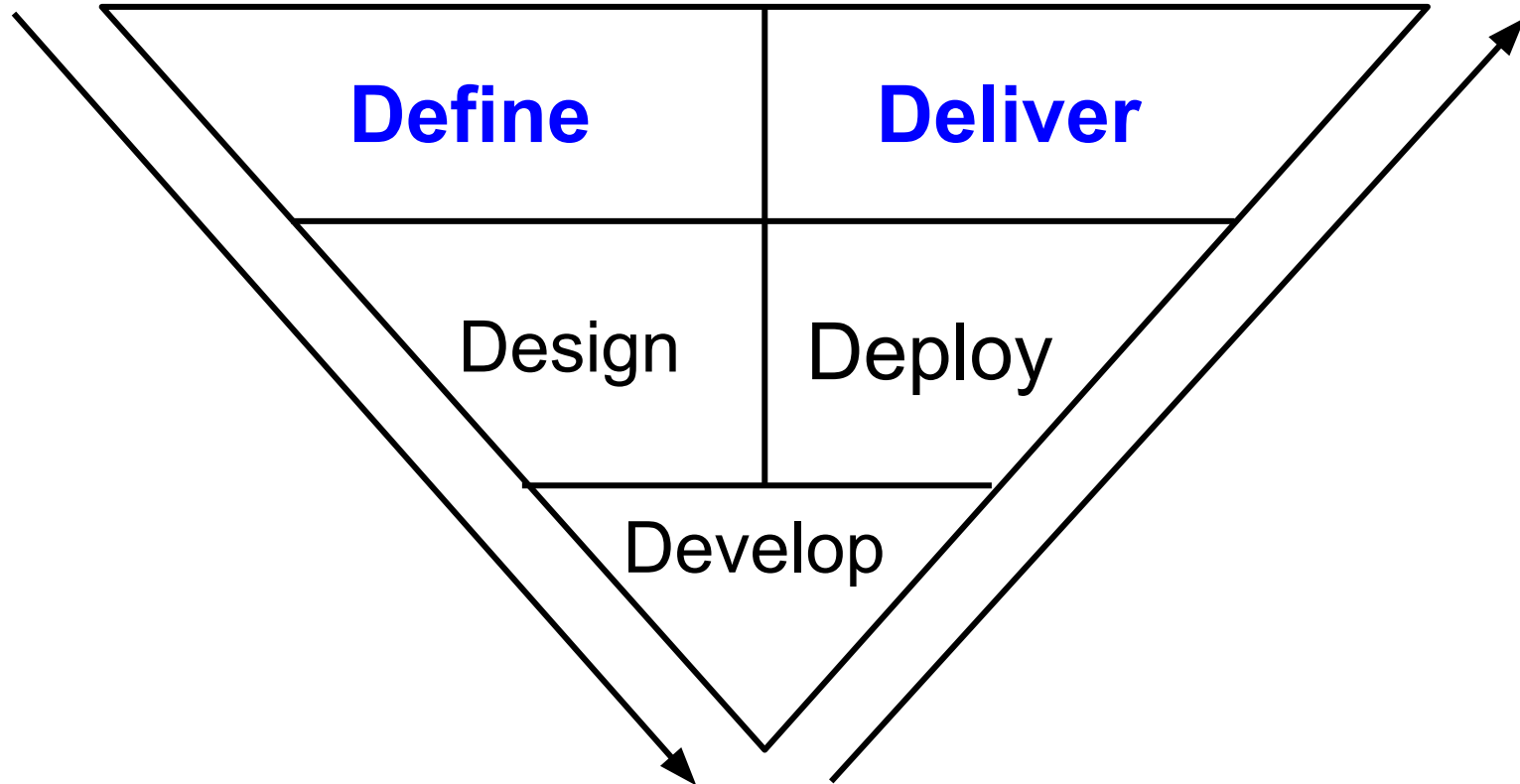
Develop: Implement the System & Algorithm

Deploy: Deploy & Run the System!

Deliver: Deliver Value to the Customer/Client/User
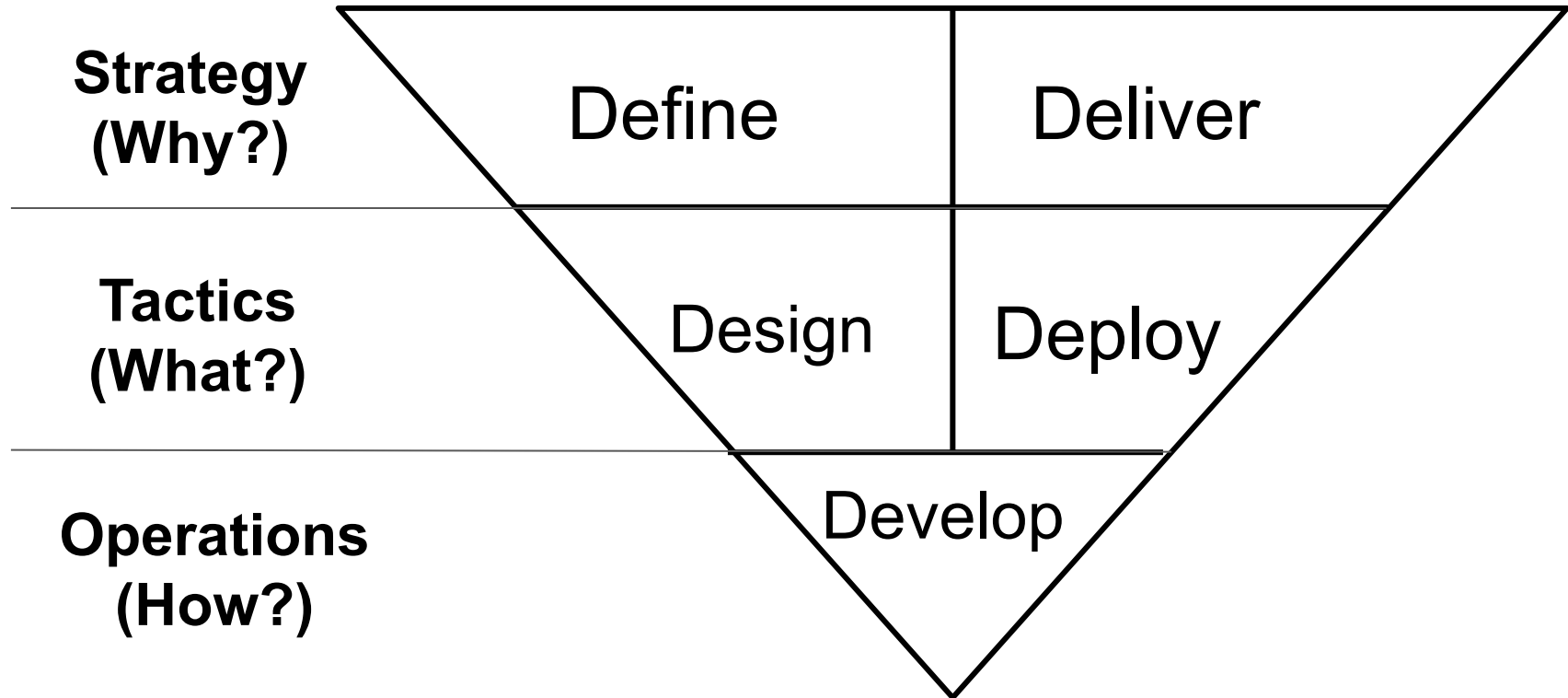
Most Important & Underrated Steps: Define & Deliver

Strategy & Tactics & Operations

Strategy
(Why?)

Tactics
(What?)

Operations
(How?)

Strategy & Tactics & Operations

Strategy (Why?)

Tactics (What?)

Operations (How?)

Define | Deliver

Design | Deploy

Develop
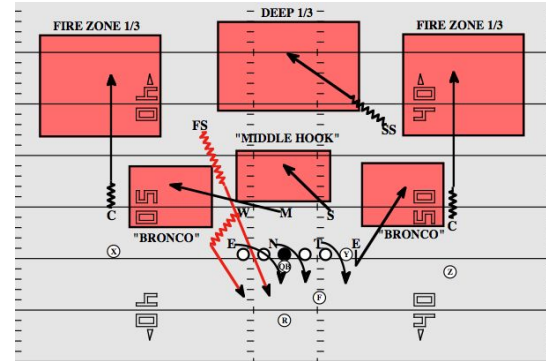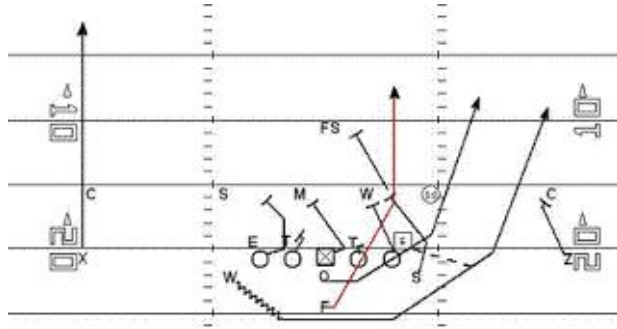
Strategy (Why?)

Tactics (What?)

Operations (How?)

Strategy (Why?)

Tactics (What?)

Operations (How?)

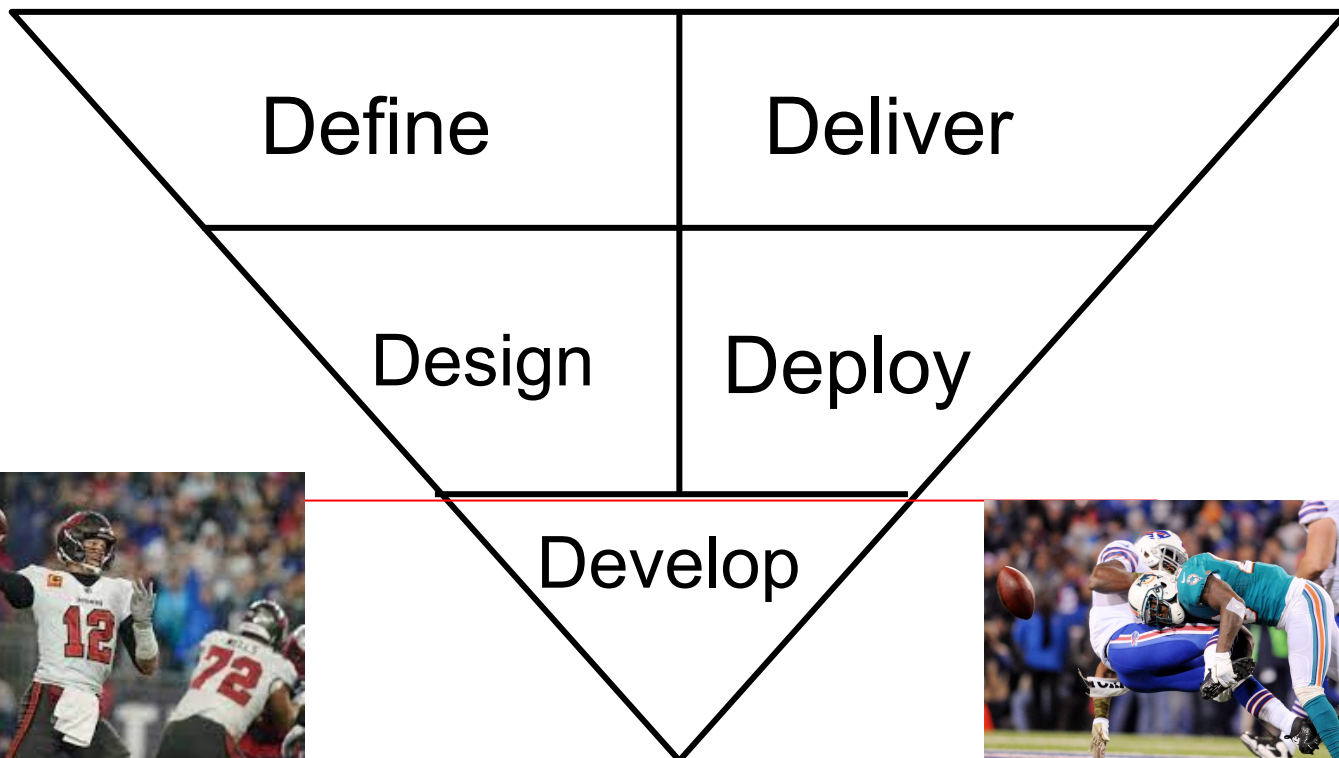**Strategy (Why?)**

Tactics (What?)

Operations (How?)

Keep Training Yourself To "Play Better"

Define

Deliver

Design

Deploy

Develop

Enjoy tackling the problem!