Week 1

Technical Workouts
1. Learn HTML, CSS by the end of this week. 2. Design at least two public website's home page using HTML & CSS with maximum components.(For Eg: Home page of LinkedIn)
Write a short description about this task *Link to the tutorials that you have followed*
Write a short description about this task *Link to your public websites* *1.* *2.* *3.*

Week 2

Technical Workouts
1. Learn JavaScript & Bootstrap by the end of this week. 2. Design a public website using HTML, CSS, JavaScript, Media queries and bootstrap. Website must be completely responsive. 3. Complete an excellent personal website using a template. The website should meet the following criteria: a. Should be responsive. b. It should contain at least six pages. c. Should not contain any dummy content or images. d. Enquiry form with validation and submission. e. Social media links with proper contact details. 4. Read the document below and check the performance of your website. Improve your website until you acquire a score above 90. https://developers.google.com/web/tools/lighthouse#devtools 5. Also learn the concepts: ● DOM manipulations and selectors. ● addEventListeners (click, scroll, change).
Write a short description about this task *Links to the tutorials that you have followed*
Write a short description about this task *Link to your project url*
Write a short description about this task *Link to your personal website*
Write a short description about this task
Write a short description about this task *Link to the screenshot showing performance score above 90*

Write a short description about this task

Week 3

Technical Workouts
1. Complete basic programming fundamentals in your domain. For example, if your domain is Python Django, learn basic programming fundamentals in Python such as variables, conditional statements, loops, arrays, functions, class, objects, etc. 2. Complete all the assignments in the following document using the language you have chosen in your domain. *Assignments: Assignment* 3. Learn the following concept. a. Class properties b. Constructor and Destructor c. Error Handling d. Modules and Packages e. Data structure inbuilt functions in python (list, dict, set, string, tuples) f. List comprehension and dict comprehension g. Lambda functions h. Generator, Iterator, Decorator i. Pass, Break, Continue j. Operators (Unary, binary, ternary, etc…)
Write a short description about this task *Link to the tutorials that you have followed*
Write a short description about this task *Link to the folder containing the code and the screenshot of the output*
Write a short description about this task

Week 4

Technical Workouts

1. Complete basic tutorial on the backend framework you have chosen. For example, if your domain is Python Django, complete a basic tutorial of the Django framework.
2. Have a clear idea about View Engine and its working. Complete at least 3 sample works using view engine concepts and bootstrap. For example, list dummy items/ cards using a loop or display table items etc.
3. Design a login and a home page. Use bootstrap & View engine.
4. Have a clear idea about Session and Cookies. Complete one or two sample works for session management.
5. Complete server side development for the login page.
    a. Login page should accept username and password from the user.
    b. Username and password should be validated at the server side with a predefined value.
    c. If correct, give access to the home page.
    d. If incorrect, display incorrect username or password message on the login page.
    e. Home page should contain a signout button. On click signout button - redirect to login page.

    Note: Session handling should work properly. Signout shouldn't happen unless the user presses the signout button. Also, once the user has signed out, the home page shouldn't be loaded on pressing the back button.
6. Have a clear idea about HTTP methods.
7. Learn these concept :
    - MVT
    - Middlewares
    - Django settings
    - Django app file structure (Model view, url)
    - Migrations
    - Database connection

● Http request ● Request response cycle ● Url Patterns
Write a short description about this task
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Week 5

Technical Workouts
1. Choose a database. Complete basics of database operations using terminal. (Do not use any language or framework you have chosen). 2. Prepare a video presentation on what you have learnt about databases. Record and upload it on youtube as an unlisted video. 3. Learn the following concept concept a. ACID properties b. Normalization c. Constraints d. Relationships e. Joins f. 3-Schema architecture g. Indexing

h. Aggregate functions i. Scalar functions j. SQL queries k. Foreign key Primary key (Other keys) l. Closure m. Groupby n. Having o. Transactions p. DML, DDL, DCL
Write a short description about this task
Link to your presentation video
Write a short description about this task

Week 6

Technical Workouts
1. Learn Object Relational Mapping queries in Django. 2. Create a web application a. Should have login, signup and home page for users b. Should store the user data on a database c. Login should be validated 3. Create an admin panel a. Admin panel should have login with validation b. Should be able to view and perform search on user data c. Should be able to create, delete and edit user data. d. Should handle sessions and cookies properly 4. Prepare your full domain review.
Write a short description about this task

Write a short description about this task *Link to your screen record video*
Write a short description about this task *Link to your screen record video*

Week 7 - Preliminary Test

1. Python
    a. OOPS concepts
    b. Constructor
    c. Destructor
    d. Generator
    e. Iterator
    f. Do practical coding on all Data types (Dictionary, Tuples, List, etc…)
2. Machine Learning Introduction
    2.1 ML basics
    2.2 Types
    2.3 Why is ML used?
    3.4 ML workflow
3. Workout practical problems from the above mentioned topics.
4. Practice some logical problems like prime numbers, unique numbers, etc…

Week 8

Data Structure Workouts
1. Learn what is Data Structure & Algorithms. 2. Learn the basics of Memory Allocation and Memory leak. 3. Learn the concept of Complexity Analysis.

NB: The complexity of common operations of all data structures should be covered.

4. Learn about Asymptotic analysis (Big-O notation).
5. Learn the concepts of Array. Complete at least three sample workouts & do at least 3 problems from any competitive coding websites (Hacker Rank, Code Chef, Leet code, Algo Expert, etc.)
6. Learn the concepts of the Linked list. Complete at least three sample workouts
    a. Construction of Singly linked list & Doubly linked list.
    b. Convert array to a linked list
    c. Add a node at the end & beginning
    d. Delete node with the value specified
    e. Insert a node after & before a node with x data
    f. Print all elements by order & reverse by order
    g. Write a program to remove duplicates in a sorted singly linked list
7. Learn the concepts of String. Complete at least three sample workouts.
   Eg: Write a function to replace each alphabet in the given string with another alphabet occurring at the n-th position from each of them.
8. Learn about Linear Search & Binary Search. Complete at least 3 sample workouts in each of them
9. Learn the concepts of Recursion. Complete at least 3 sample workouts.
10. Learn about the applications of all structures you covered this week

Write a short description about Array

Link to the folder containing code and screenshot of the output

Write a short description about Linked list

Link to the folder containing code and screenshot of the output

Write a short description about string

Link to the folder containing code and screenshot of the output

Write a short description about Linear search and Binary search

Link to the folder containing code and screenshot of the output

Write a short description about Recursion *Link to the folder containing code and screenshot of the output*

Week 9

Data Structure Workouts
1. Learn about Bubble Sort, Insertion Sort, Selection Sort, Quick sort and Merge sort. Complete at least three sample workouts in each of them. 2. Learn the concept of Stack and Queue. Complete at least three sample workouts in each of them & do at least 3 problems from any competitive coding websites (Hacker Rank, Code Chef, Leet code, Algo Expert, etc.) a. PUSH, POP and Display elements in Stack b. Enqueue, Dequeue and Display elements in Queue 3. Learn the concepts of Hash Table. Complete at least 3 sample workouts. 4. Learn about the Applications of all structures you covered this week
Write a short description about this task *Link to the folder containing code and screenshot of the output*
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Write a short description about this task *Link to the folder containing code and screenshot of the output*
Write a short description about this task

Week 10

Data Structure Workouts
1. Learn the concepts of Tree. Complete at least three sample workouts.

2. Learn the concepts of Binary Search Tree. Complete at least three sample workouts.
   Example:
   a. Create a Binary Search Tree with insertion, contains, delete, three traversals (postorder, preorder, in order).
   b. Find the closest value to a given number in a Tree.
   c. Validate whether a given tree is BST or not.
3. Learn the concepts of Heap. Complete at least three sample workouts.
   Example:
   a. Create a min heap & max heap with build, insert, remove.
4. Learn the concept of Heap sort. Complete at least three sample workouts
5. Learn the concepts of Trie. Complete at least 3 sample workouts.
6. Learn the concepts of Graph. Complete at least three sample workouts.
7. Learn the concepts of Graph traversals (BFS, DFS).
8. Do at least 3 problems each for every structure from any competitive coding websites
9. Learn about the applications of all structures you covered this week

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Write a short description about this task

Link to the folder containing code and screenshot of the output

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Write a short description about this task

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Write a short description about this task *Link to the folder containing code and screenshot of the output*

Week 11

Technical Workout

1. Learn the following concept
    a. What is Data Science?
    b. Why is Data Science used?
    c. How Data Science works?
    d. Data Ethics
    e. Data Science Workflow
    f. Different types of data
    g. Challenges in Data Science
2. Linear Algebra for Data science
    a. Concepts of Matrix
    b. Matrix representations, transformation
    c. Dot Product
    d. Eigenvalues
    e. Eigenvectors etc.
    f. Matrix Operations
    g. Matrix types
    h. Create python scripts for all the matrix concepts without using any python libraries.
3. Data Science based Case Study (anyone).
4. Identify a problem and learn how to it is solved
5. Create a document for all the things you have gone through for future reference.

Write a short description about this task
Write a short description about this task
Write a short description about this task
Write a short description about this task
Link to the document

Week 12

Technical workout

Learn how to calculate and the meaning of each term
 	
1. Statistics for DataScience:
    a. Descriptive Statistics
    b. Variability
    c. Different types of Correlation
    d. Different types of Covariance
    e. Probability Distribution
    f. Regression
    g. Bias / variance tradeoff
    h. Hypothesis testing
2. Central tendency measures
    a. Vector Calculus
        i. Univariate, Bivariate, Multivariate
        ii. Learn about Gradients
        iii. Hypothesis
        iv. Testing
3. Probability concepts:
    a. Basics of Probability.
    b. Types of distribution
    c. Random Variables
    d. Central Limit Theorem
    e. Sampling etc
4. Optimization & Optimization techniques
5. Prepare python scripts to find statistics and probability concepts.
6. Refer and explain a data Science case study.

7. Prepare a reference document for the above concepts.
Write a short description about this task
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Write a short description about this task
Link to the document

Week 13

Technical Workouts
1. Machine Learning Introduction a. ML basics b. Types c. Why is ML used? d. ML workflow e. Classification, Regression, Clustering Concepts 2. Create python scripts for the above concepts and present them. 3. Refresh python basics, data structures etc. 4. Learn jupyter notebook, virtual environment usages. 5. Learn pandas, numpy and scikit learn usages. Note :- Please don't stick only to the concepts given above, you have to read more than that.
Write a short description about this task

Write a short description about this task
Link to your script

Week 14

Technical Workouts

1. Learn plotting using matplotlib, seaborn.
2. Create a venv and do all the concepts mentioned above using a jupyter notebook.
3. Choose any 3 data sets and try out the concepts you studied.
4. Scikit Learn
  a. Implement Linear regression
  b. Implement a sample classification
  c. Implement a clustering algorithm
  d. Evaluation metrics for each and with code and plots
5. Prepare a reference document for the above concepts.
6. Prepare your full domain review.

Write a short description about this task
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Write a short description about this task
Link to the document

Week 15

Technical Workouts
1. Data Preprocessing a. Learn Data Preprocessing and Exploratory Data Analysis (EDA) concepts. b. Select any 3 dataset (other than previous) and do data preprocessing and EDA tasks. c. Create a document which should list your opinion, insights of the data. 2. Git Concepts a. Study git concepts. b. Create a git account and push the code in your account. 3. Machine Learning Concepts: a. Vectorization concepts b. Performance concepts c. Optimization concepts d. Select a dataset (other than previous) and perform EDA, preprocessing and create a model. 4. Do all the above studied concepts.
Write a short description about this task
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Week 16

Technical Workouts

1. Feature selection techniques in ML.
    a. Filter, Wrapper, Embedded, Hybrid
    b. Create a notebook feature selection technique using python.
2. Feature Engineering Techniques in ML
    a. Discretization, Categorical encoding, Feature splitting, Imputation
    b. Create a notebook with feature engineering techniques using python.
3. One workout each for Feature engineering and Feature selection.
4. Learn about these topics
    a. Scaling
    b. Creating features
    c. Handling Outliers
    d. Variable transformation
5. Classification
    a. Classification concepts
    b. Types of Classification
6. Classification Algorithms:
    a. Implement Logistic Regression
    b. Implement Naive Bayes Classifier
    c. Implement K-Nearest Neighbors

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Week 17

Technical Workouts
1. Classification Algorithms (Continuation): a. Implement Decision Tree b. Implement Random Forest c. Implement Support Vector Machine 2. Evaluation Metrics for Classification 3. Learn how to save models. 4. Hyperparameter Tuning Techniques (study any algorithms) 5. Learn and try out all algorithms and concepts mentioned above.
Write a short description about this task
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Week 18

Technical Workouts

1. Regression
    a. Regression Concepts
    b. Types of Regression
2. Regression Algorithms:
    a. Linear Regression
    b. Implement Multiple Linear Regression
    c. Implement Decision Tree for Regression
    d. Implement Ridge Regression

Write a short description about this task

Write a short description about this task

Week 19

Technical Workouts

1. Implement Lasso Regression
2. Implement Polynomial Regression
3. Implement Support Vector Regression
4. Implement Evaluation Metrics for Regression
5. Clustering
    a. Clustering Concepts
    b. Clustering Types
6. Clustering Algorithms:
    a. Implement K-means
    b. Implement DBSCAN
7. Ensemble Techniques
8. Boosting
9. Bagging

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Week 20

Technical Workouts
1. Prepare your full domain review.
Write a short description about this task

Week 21

Technical Workouts
2. Deep Learning a. Introduction to Deep Learning b. Deep Learning Process c. Neural Network - Basics, Architecture, Working

d. Activation Functions, Cost Function, Gradient Descent
e. Types of Deep Learning Networks (a basic understanding)
f. Types of Propagation
g. Applications of Deep Learning
h. Limitations of deep learning
i. Optimization Techniques in Deep Learning

Write a short description about this task

Week 22

Technical Workouts

1. Learn the concepts in Structured Query Language & Relational Database.
    - Learn the types of queries
        a. SELECT, SELECT LIMIT, SELECT TOP, INSERT, UPDATE, DELETE, TRUNCATE TABLE, UNION, UNION ALL, INTERSECT, MINUS, EXCEPT
    - Learn the concept of Comparison Operators & Logical Operators
    - JOIN
    - Aliases
    - Learn the concepts of Clauses
        a. DISTINCT, FROM, WHERE, ORDER BY, GROUP BY, HAVING
    - Learn the concept of Functions
        a. COUNT, SUM, MIN, MAX, AVG
    - Learn the following conditional operators
        a. AND, OR, AND&OR, LIKE, IN, NOT, IS NULL, IS NOT NULL, BETWEEN, EXISTS

- Learn the following concepts in Tables & Views
    a. CREATE TABLE, CREATE TABLE AS, ALTER TABLE, DROP TABLE, GLOBAL TEMP, LOCAL TEMP, SQL VIEW.
- Learn the concepts in Keys, constraints & indexes
    a. Primary keys, Indexes
- Learn the concepts of data types.
- Learn the concepts Stored procedure,

2. Complete all the assignments given in the below document.

SQL: Assignments

3. Learn the following concepts.

- While loop
- If else
- CTE
- Sub query
- Partition By
- Row number
- Trigger
- Pre defined function

Write a short description about this task

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Week 23

Technical Workout
1. Tableau Basics a. Learn about basics of Tableau

b. Installation & Setup
c. Connect a data source & visualize
d. Workflow
e. File Types
f. Data Types
g. Show me
h. Data Terms

2. Tableau Data Sources
    a. Data Sources
    b. Custom Data View
    c. Extracting Data
    d. Fields Operations
    e. Editing Metadata
    f. Data Joining
    g. Data Blending
3. Tableau Worksheets
    a. Add Worksheets
    b. Rename Worksheet
    c. Save & Delete Worksheet
    d. Reorder Worksheet
    e. Paged Workbook
4. Tableau Calculations
    a. Operators
    b. Functions
    c. Numeric Calculations
    d. String Calculations
    e. Date Calculations
    f. Table Calculations
    g. LOD Expressions
5. Tableau Sort & Filters

a. Basic Sorting
b. Basic Filters
c. Quick Filters
d. Context Filters
e. Condition Filters
f. Top Filters
g. Filter Operations

6. Tableau Charts
    a. Bar Chart
    b. Line Chart
    c. Pie Chart
    d. Crosstab
    e. Scatter Plot
    f. Bubble Chart
    g. Bullet Graph
    h. Box Plot
    i. Tree Map
    j. Bump Chart
    k. Gantt Chart
    l. Histogram
    m. Motion Charts
    n. Waterfall Charts
7. Tableau Advanced
    a. Dashboard
    b. Formatting
    c. Forecasting
    d. Trend Lines
8. PowerBI

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Week 24

Technical Workouts

1. NLP Basics
    • Working
    • Applications
    • Challenges
2. Tokenization
3. Vectorization methods
    • TF-IDF
    • Bag of words
    • Word2vec
    • CountVectorizer
4. Corpus
5. Stemming
6. Lemmatization
7. Named entity recognition

8. Ngrams 9. Create a sentiment analysis project which is able to classify positive, Negative and Neutral reviews
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Write a short description about this task *Link to your project repository*

Week 25

Technical Workouts
1. Learn about Keras, Pytorch or Tensorflow. 2. Learn about Recurrent Neural Network (Introduction, Architecture & Training) 3. Learn about LSTM network
Write a short description about this task
Write a short description about this task
Write a short description about this task

Data Science Project

1. Real time Stock data Analysis
    a. Create a dashboard with relevant data
    b. Predict stock value and evaluate over time and visualize
2. Customer Segmentation
    a. Collect purchase transactions data for multiple users
    b. Create general dashboard
    c. Segment and visualize different customer clusters