

1. Description

In this project you will write an interactive AI tutorial about Search problems. You will write it as a Jupyter notebook which implements and explains some of the essential algorithms you have seen in class.

The Jupyter notebook has to explain the algorithms and related concepts in both Arabic and English, and most importantly it has to explain how to implement the algorithms from scratch.

The notebook should also contain at least one appropriate formulated problem to which the algorithm is applied. The problem should preferably be a simplified problem from our background and daily interactions.

You should guide the reader to test and change variables in the problem/algorithm so they can understand the important concepts.

The following table contains the algorithm you need to explain, implement, and show their performance on the formulated problem.

After completing the tutorial, the notebooks should be uploaded to Google Colab.

Developing Interactive AI Tutorials

Teaching is the best way to learn.

Notebook Title	Main Concepts	Algorithms
Constraint Satisfaction Problems	<ul style="list-style-type: none">• CSP model of the Problem<ul style="list-style-type: none">◦ Variables◦ Domains◦ Constraints◦ Relations◦ Solution• Problem formulation<ul style="list-style-type: none">◦ Initial state◦ Actions◦ State space◦ Goal test• Constraint Satisfaction Problems.• Heuristics for CSPs.• Explanation of algorithms.• Comparison of algorithm's performance.	<ul style="list-style-type: none">• Arc Consistency AC-3• Backtracking with AC-3• Forward Checking

A suggested notebook layout is as follows:

- Introduction
 - Explains the objectives and main concepts.
- An example problem
 - Explains the problem and its formulation.
- The algorithm:
 - Explanation
 - Implementation
 - Applying the algorithm on the problem
 - Testing the algorithm on several samples and reporting the results
- References and resources

To help the reader visualize the algorithm the notebook should also contain figures, and preferably useful animations.

It is very important to correctly cite any resource you use, failure to do so is considered plagiarism. Refer to section

Examples of existing notebooks that you may use as guidance, however using the

. Deliverables

1. The notebook and any related files like figures, animations, data files... all submitted

a. In a zipped folder.

The basic topics in python that you might need in the project depending on your implementation are dealing with:

- a. Lists.
- b. Numpy arrays.
- c. Reading text files.
- d. Defining functions.
- e. Defining classes.