



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

COS 710: Artificial Intelligence
Assignment 3 – Structure-Based GP
Due Date: 19 May 2025

This assignment requires you to employ structure-based genetic programming to produce a classifier capable of predicting whether a patient has hepatitis based on their medical information. A regular genetic program should also be implemented to compare against – you may use the GP from Assignment 1 for this. The *hepatitis* dataset is to be used.

The dataset can be found at:

<https://github.com/EpistasisLab/pmlb/tree/master/datasets/hepatitis>

and additional information can be found at:

<https://epistasislab.github.io/pmlb/profile/hepatitis.html>

Assignments must be submitted via clickUP and must include the source code, compiled code and the report. The report must include the following:

- A brief description of the dataset used, and any pre-processing done on the data.
 - A description of the structure-based GP algorithm, specifically:
 - The representation used to represent an individual
 - Define the function and terminal sets used
 - Define the fitness function used
 - The selection method used
 - Describe the genetic operators used
 - Termination criterion used
- List the parameters used for the structure-based genetic programming algorithm and briefly explain how the values were arrived at.
- Tables presenting the best, average and standard deviation of the objective values over at least 10 runs performed for the structure-based GP
 - Discuss the results and compare with the results from the regular GP.

Total: 25