Title
Golf Course Routing Using Artificial Intelligence

Research question
Can artificial intelligence methods be used in 2d golf course routing?If so, how? If not, why?

Methods to investigate
Genetic Algorithm - Define genes, fitness functions, use frameworks and algos like GOMEA, DEAP, etc.
Constraint Programming - Modelling of the problem, define constraints, decision variables, etc
Random Search - More like a baseline
Reinforcement Learning - Creation of a gym environment, testing out different algorithms, possibly multi-agent RL
Generative AI - Data-driven design based on existing architectures, optimisation and variation using techniques like GAN

Success criterion
Time taken for a design
Computational costs for optimisation
The “quality” of results produced under a given time and resource constraint (possibly multiple)

End goal
A “good” routing mechanism with number of holes as input parameter

Future work (if all goes well)
Development of gui and software, based on the backend optimisation engine
Extension to 3d, involving topography and contours
Addition of softer, user defined, constraints

Timeline and Roadmap (Starting from 13th Nov)
Thesis reading, literature review and planning - 2 or 3 weeks
A BFS approach, i.e, exploring different options and creating stupid solutions in each of them - 4 to 6 weeks
Taking the most promising method, modifying and experimenting with simple cases - 3 to 4 weeks
Moving to more complex and difficult cases - 4 to 6 weeks
Further experimentation and focus on improved visualisation - 4 to 6 weeks

*this section depends on which methods works best in the initial phase

Thesis review, changes and improvements (post green light) - 6 to 8 weeks