# Project Requirements

**Project Objectives**: The objectives of this project can be summarized as applying the main ideas, fundamental concepts, and key algorithms in the fields of artificial intelligence, and machine learning.

## Submission and Discussion

**(1) Project.(Coding ,algorithms,complexity,expirements Compare the complexity of the algorithm with another).**
**(2) Documentation.**
**The report should include the following:**
(1) ***Project idea in details.***
***(2) Main functionalities***
(3) ***Similar applications in the market.***
***(4) An initial literature review of Academic publications (papers) relevant to the idea (at least 5 papers)***
***(5) the Dataset employed (preferably a publicly available dataset)***
***(6) Details of the algorithm(s)/approach(es) used and the results of the experiments.***
***(7) Development platform.***

## Assessment

Assessment will be on the reports and code submitted, in addition to discussions with team members.
All the team members must contribute to all the phases, and the role of each member must be clearly stated in each report.
o The Project will be assessed based on the following criteria:

1. ▪ The complexity of the problem, & the correctness of the algorithms employed.
2. ▪ The quality/comprehensiveness of your experiments & documentation.
3. ▪ The correctness of your analysis and design diagrams.
4. ▪ Implementation correctness.

# Solving the Knapsack Problem using Swarm Intelligence: Particle Swarm Optimization (PSO) algorithm *(Solve both the 0-1 Knapsack Problem and the Unbounded Knapsack Problem)*

(*Presentation Topic:* Swarm Intelligence: PSO algo.)

- **The knapsack problem or rucksack problem is a problem in combinatorial optimization: Given a set of items,**

**each with a <u>weight and a value</u>,**

- **determine the number of each item to include in a collection so that the total**
- **weight is less than or equal to a given limit and the total value is as large as possible.**
- **It derives its name from the problem faced by someone who is constrained by a fixed-size knapsack and must fill it with the most valuable items.**
- **The most common problem being solved is the 0-1 knapsack problem, which restricts the number of copies of each kind of item to zero or one.**
- **The unbounded knapsack problem (UKP) places no upper bound on the number of copies of each kind of item.**