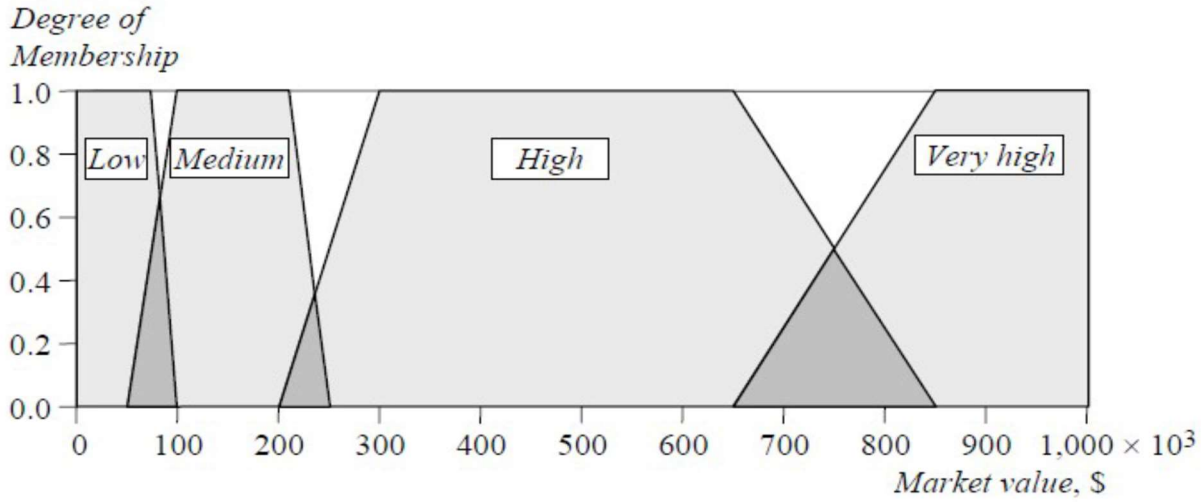
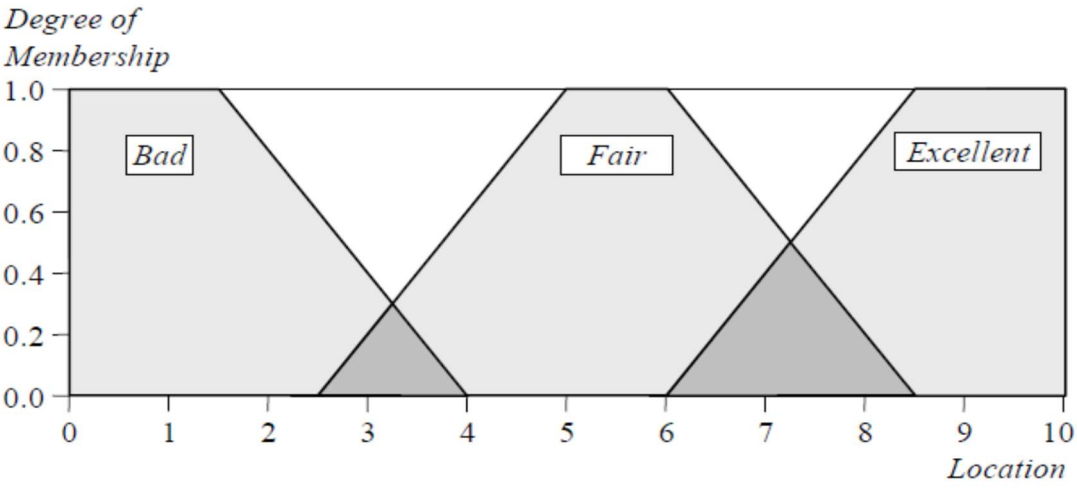
COM2536 Fuzzy Logic

In this project, you are required to develop a fuzzy logic system for bank officers that determines the amount of housing credit for an applicant by employing some features of the corresponding house and some information about the applicant.
The parameters such as market value and income will be utilized through the membership functions given as follows:

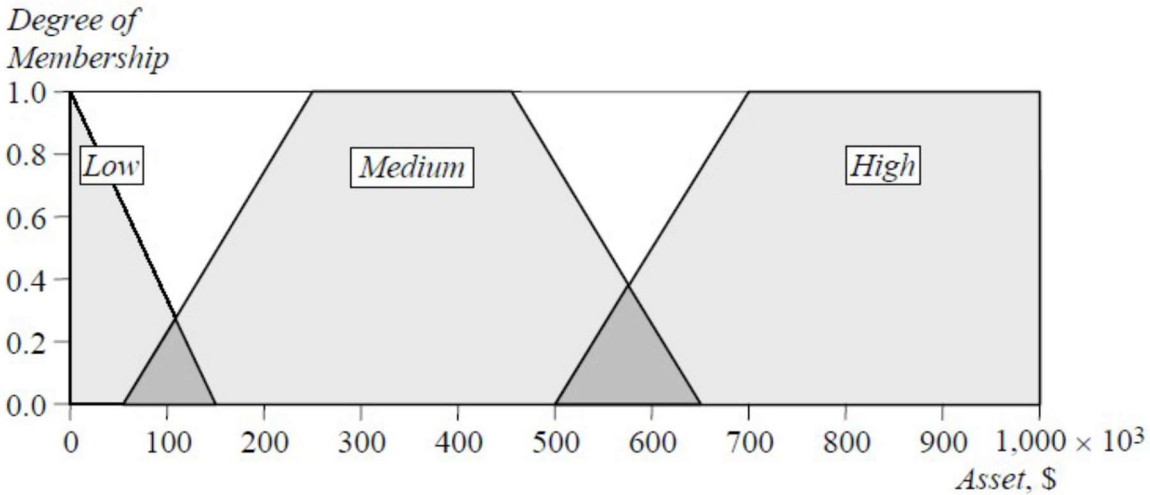
1. Market Value of the House:



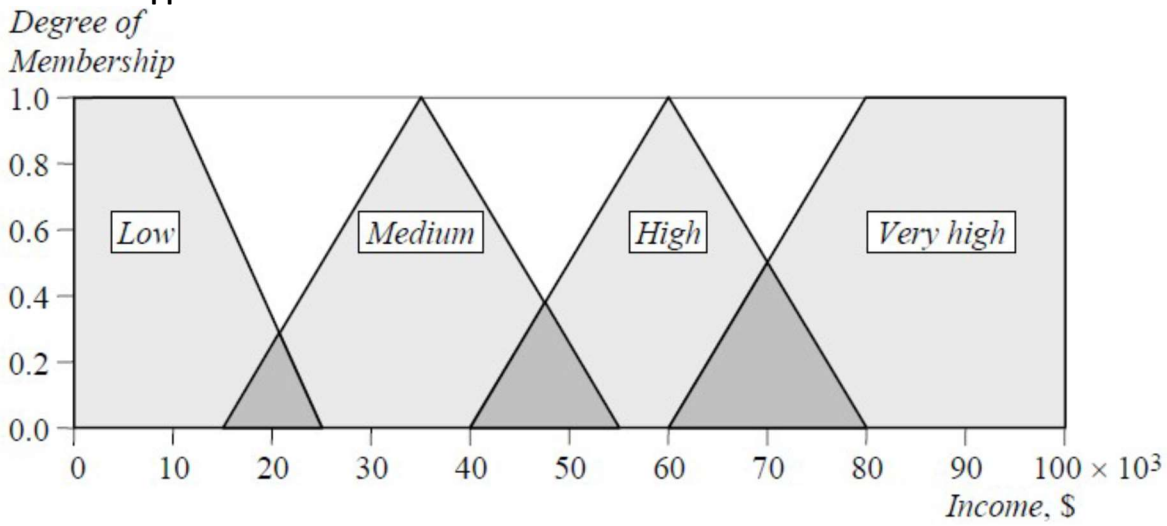
2. Location of the House:



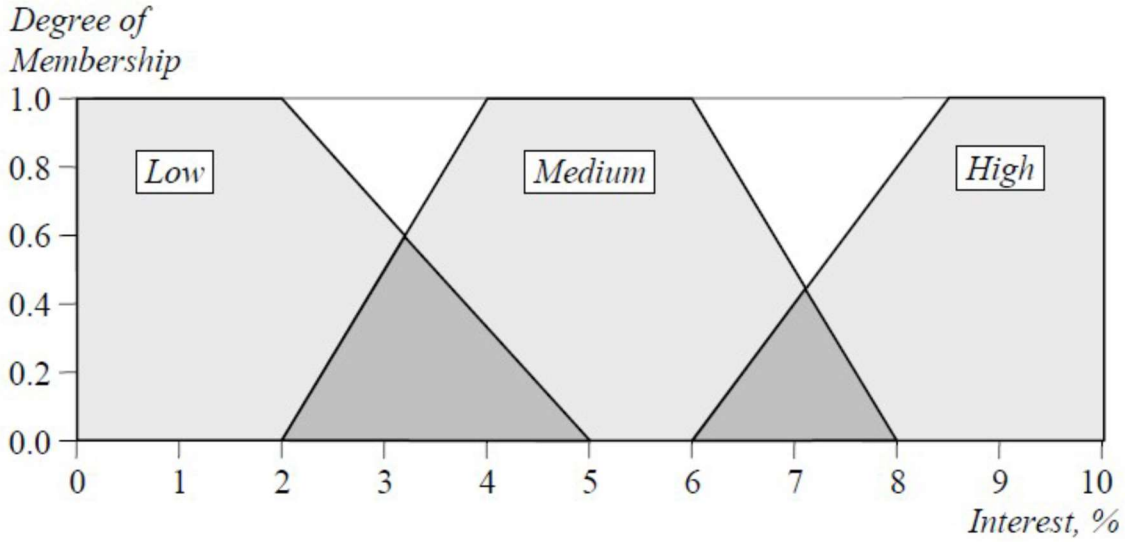
3. Asset of the Applicant:



4. Income of the Applicant:

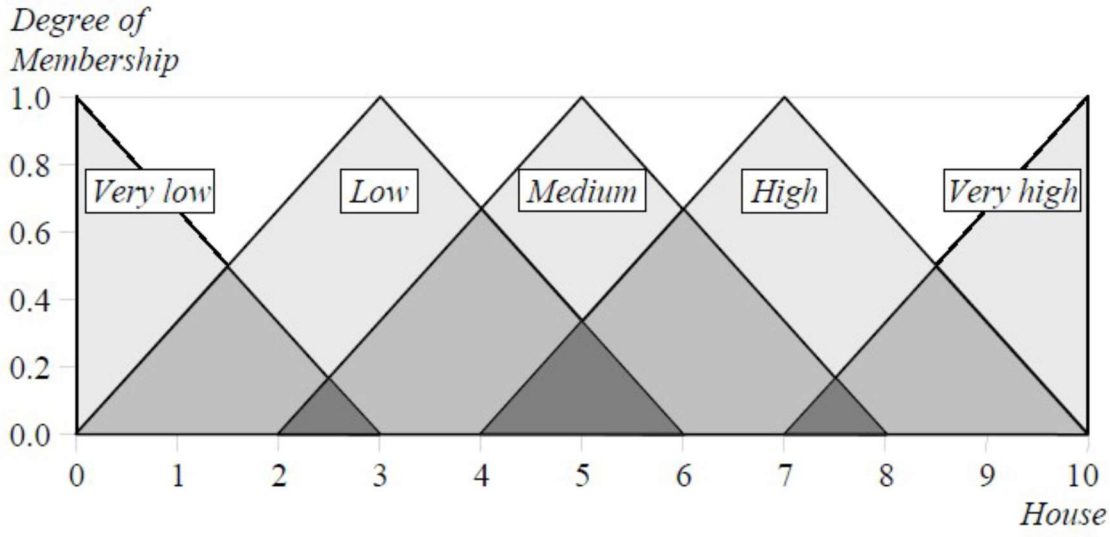


5. Interest:

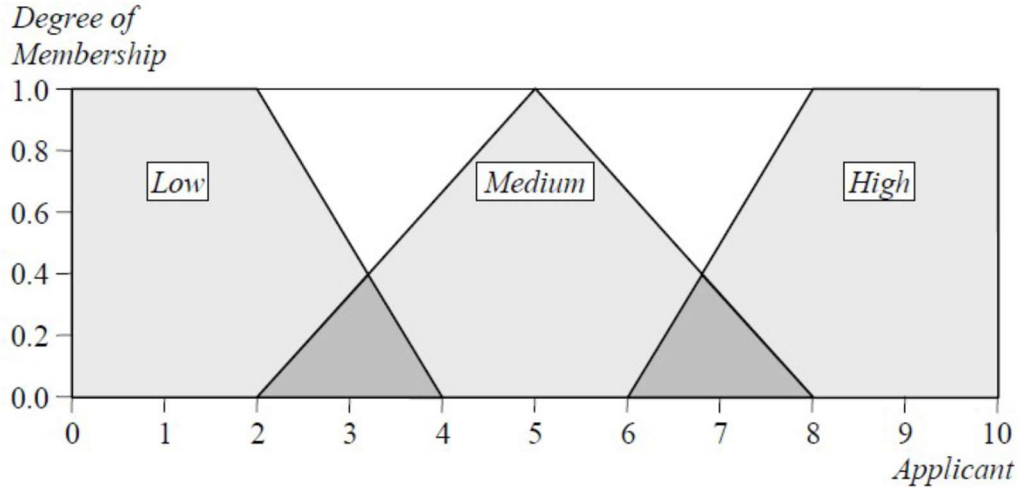


Based on the information provided by the applicant, your program first calculates an evaluation for the house and and an evaluation for the applicant using the hierarchical structure given in Figure 1.

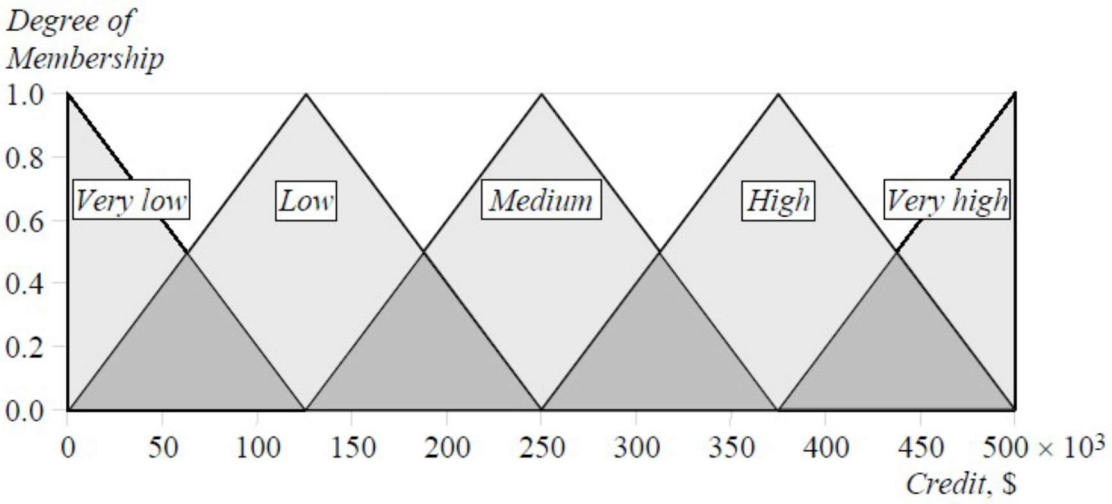
1. House:



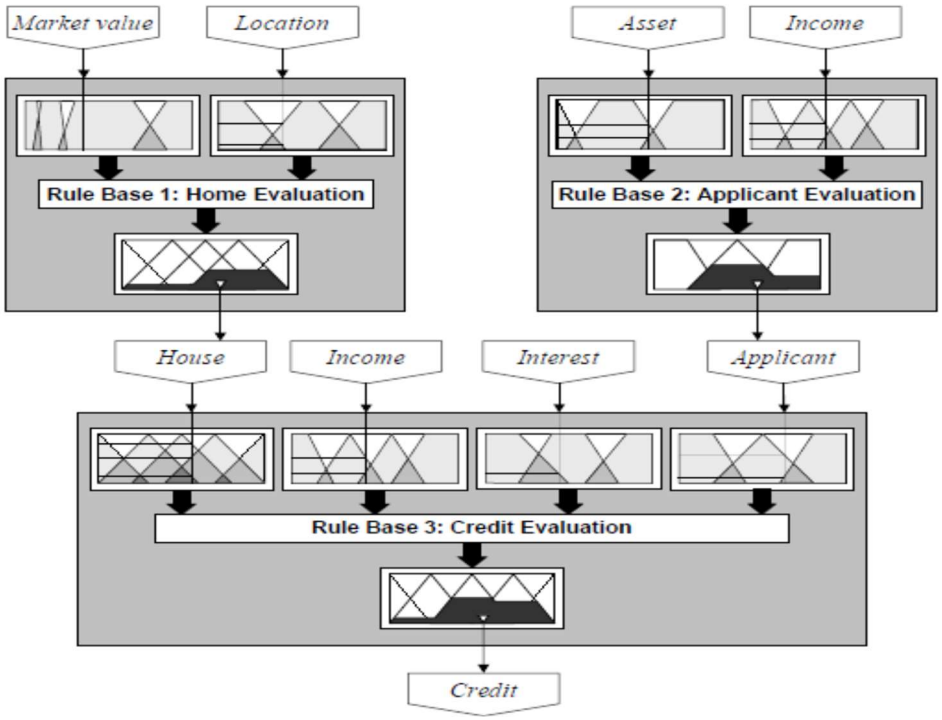
2. Applicant:



3. Credit Amount



Your program then calculates the credit's amount for the applicant using the evaluation of the applicant and the evaluation of the house together with the applicant's income and the interest rate using the hierarchical structure given in Figure 1.



Firgure 1. The hiearchical structure of the program

The rule set:

1. House Evaluation

1. If (Market_value is Low) then (House is Low)
2. If (Location is Bad) then (House is Low)
3. If (Location is Bad) and (Market_value is Low) then (House is Very_low)
4. If (Location is Bad) and (Market_value is Medium) then (House is Low)
5. If (Location is Bad) and (Market_value is High) then (House is Medium)
6. If (Location is Bad) and (Market_value is Very_high) then (House is High)
7. If (Location is Fair) and (Market_value is Low) then (House is Low)
8. If (Location is Fair) and (Market_value is Medium) then (House is Medium)
9. If (Location is Fair) and (Market_value is High) then (House is High)
10. If (Location is Fair) and (Market_value is Very_high) then (House is Very_high)
11. If (Location is Excellent) and (Market_value is Low) then (House is Medium)
12. If (Location is Excellent) and (Market_value is Medium) then (House is High)
13. If (Location is Excellent) and (Market_value is High) then (House is Very_high)
14. If (Location is Excellent) and (Market_value is Very_high) then (House is Very_high)

2. Applicant Evaluation

1. If (Asset is Low) and (Income is Low) then (Applicant is Low)
2. If (Asset is Low) and (Income is Medium) then (Applicant is Low)
3. If (Asset is Low) and (Income is High) then (Applicant is Medium)
4. If (Asset is Low) and (Income is Very_high) then (Applicant is High)
5. If (Asset is Medium) and (Income is Low) then (Applicant is Low)
6. If (Asset is Medium) and (Income is Medium) then (Applicant is Medium)
7. If (Asset is Medium) and (Income is High) then (Applicant is High)
8. If (Asset is Medium) and (Income is Very_high) then (Applicant is High)
9. If (Asset is High) and (Income is Low) then (Applicant is Medium)
10. If (Asset is High) and (Income is Medium) then (Applicant is Medium)
11. If (Asset is High) and (Income is High) then (Applicant is High)
12. If (Asset is High) and (Income is Very_high) then (Applicant is High)

3. Evaluation of the Amount of Credit

1. If (Income is Low) and (Interest is Medium) then (Credit is Very_low)
2. If (Income is Low) and (Interest is High) then (Credit is Very_low)
3. If (Income is Medium) and (Interest is High) then (Credit is Low)
4. If (Applicant is Low) then (Credit is Very_low)
5. If (House is Very_low) then (Credit is Very_low)
6. If (Applicant is Medium) and (House is Very_low) then (Credit is Low)
7. If (Applicant is Medium) and (House is Low) then (Credit is Low)
8. If (Applicant is Medium) and (House is Medium) then (Credit is Medium)
9. If (Applicant is Medium) and (House is High) then (Credit is High)
10. If (Applicant is Medium) and (House is Very_high) then (Credit is High)
11. If (Applicant is High) and (House is Very_low) then (Credit is Low)
12. If (Applicant is High) and (House is Low) then (Credit is Medium)
13. If (Applicant is High) and (House is Medium) then (Credit is High)
14. If (Applicant is High) and (House is High) then (Credit is High)
15. If (Applicant is High) and (House is Very_high) then (Credit is Very_high)

Project Requirements:

1. You are required to show that your program works, and properly generates the amount of the credits **for at least three different applicants.**
2. Your program must use the **Mamdani inference method** to generate the results.
3. You are also required to provide a brief report that explains the components of the developed program and how the program utilizes these components to generate the results. Besides, the three results mentioned in the first bullet must be added to the report. Note that the report must consist of at least three pages.
4. You can develop the program in any of the programming languages.
5. Due date for the project is: **May 30 till 11.00 pm**. You must submit your report and source codes (must be in .pdf format) before the deadline