**LAB 2 REPORT**

**Introduction to Artificial Intelligence**

# Group Information

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| **Name** | **Student ID** |
| Nguyễn Lê Hùng | 22127135 |
| Trần Văn Quyết |  |

# Accomplished requirements

**Requirements overview**

**Propositional Logic**

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| --- | --- | --- |
| **Stage** | **Requirement** | **Proress** |
| 1 | Đọc dữ liệu đầu vào và lưu trồng cấu trúc dữ liệu phù hợp |  |
| 2 | Cài đặt giải thuật hợp giải trên logic mệnh đề |  |
| 3 | Các bước suy diễn phát sinh đủ mệnh đề và kết luận đúng |  |
| 4 | Tuân thủ mô tả định dạng của đề bài |  |
| 5 | Báo cáo test case và đánh giá |  |

**Technical specifications**

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| --- | --- |
| **Tools** | **Role** |
| Python version >= 3.1 | Program structure, backbone bootstrapper for other modules. |

# Propositional Logic

### A,The Resolution Algorithm

The Resolution Algorithm is a method to see if a knowledge base (KB) supports a statement (α). It does this by assuming the opposite (not α) is true and trying to prove that this leads to a contradiction.

The algorithm works best with statements in a specific format (CNF), so luckily we don't need to worry about converting the input data (KB and not α) because it's already guaranteed to be in that format.

Resolution works by comparing pairs of statements in the knowledge base. If a pair has opposite ideas (complementary literals), it combines them into a new statement. This new statement is added to the knowledge base as long as it's not already there.

The process continues until one of two things happens:

* We end up with a statement that's always false (empty clause). This means there's a contradiction in the knowledge base, or the knowledge base actually supports the original statement (α).
* No new statements can be created by comparing pairs. This means the knowledge base doesn't support the original statement (α).

Below is the pseudocode code of the resolution algorithm from the book

Artificial Intelligence: A Modern Approach (AIMA) Third Edition, Chapter 7, Figure

A screenshot of a computer

Description automatically generated

### B,Test cases

|  |  |  |
| --- | --- | --- |
| **Number** | **Input** | **Output** |
| 1 | D  4  -A OR -B OR C  -B OR -C OR D  B  C  - | 5  -B OR -C  -A OR C  -C OR D  -A OR -B OR D  -B OR D  5  -A OR -B  -A OR D  -B  D  -C  2  {}  -A  YES |
| 2 | S OR T  6  -P OR Q OR U  R OR -S  P OR T  -Q OR -R  -T OR U  Q | 6  -P OR -R OR U  P OR U  -R  Q OR T OR U  -Q OR -S  P  5  -R OR T OR U  -P OR -S OR U  -R OR U  -S OR T OR U  Q OR U  1  -S OR U  0  NO |
| 3 | E  9  A  -A OR B  -B OR -C OR -D OR E  -A OR F  -G OR H  -F OR G  -G OR E  C  E | 10  -B OR -C OR -D  -F OR H  B  {}  -B OR -D OR E  -A OR -C OR -D OR E  F  -G  -A OR G  E OR -F  YES |
| 4 | H  12  -A OR C  -B OR E  -A OR D  -B OR D  -A OR -E OR -D OR F  -E OR B  -E OR C  -A OR F OR -G  -A OR F OR H  -E OR -F OR H  E  F | 16  -A OR F  -A OR -B OR -D OR F  D OR -E  -A OR -D OR -E OR H  -F OR H  B  -A OR -E OR F  -B OR C  -A OR -D OR F  -E OR -F  -A OR -E OR -G OR H  -A OR -B OR -E OR F  -E OR H  -A OR -E OR H  -B OR -F OR H  C  20  -A OR -G OR H  -B OR -F  -A OR -E OR -G  -F  -A OR -D OR -E  -A OR -E  -A OR -D OR H  D  -A OR -B OR F  -A OR H  -A OR -B OR -E  -A OR -B OR -G OR H  -A OR -B OR H  -B OR H  -E  H  -A OR -B OR -E OR H  -A OR -B OR -D OR -E  -A OR -B OR -D OR H  -A OR -B OR -D OR -E OR H  8  -A OR -G  -A OR -B  -A OR -B OR -D  -A  {}  -B  -A OR -D  -A OR -B OR -G  YES |
| 5 | -P OR Q  8  S OR T OR U  Q OR -R  -P OR T  -B OR U  R OR -T  -S  B OR -Q OR U  Q OR S | 11  R OR S OR U  -Q OR U  T  B OR S OR U  S  -P OR R  T OR U  B OR -R OR U  -R  Q OR -T  Q  15  B OR -P OR U  S OR U  B OR U  {}  -P OR Q  R  Q OR U  -P  -T OR U  B OR -T OR U  -R OR U  -T  Q OR S OR U  U  R OR U  YES |

**C.Evaluate**

* The algorithm efficiently operates on data that has been standardized according to conventions.
* The number of propositions generated is relatively large, increasing rapidly when the number of different literals in the initial propositions of the knowledge base is high.

1. **Reference**

*Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig (Chapter 3.3.2) ([URLaima3e stanford ON Stanford University people.cs.stanford.edu])*