Deliverable 5

# 1: Models and entailment in propositional logic

**Assignment 1**

Knowledge base:

* B4,1, B4,3 and not B4,2
* B4,1 🡪 P3,1 or P4,2  (I)
* B4,3 🡪 P3,3 or P4,4 or P4,2 (II)
* Not B4,2 🡪 not P4,1 and not P3,2 and not P4,3 (III)

Truth table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| P3,1 | P3,2 | P3,3 | P4,4 | B4,1 | B4,3 | B4,2 | Marks: |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | α1,  α3, |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | α1,  α2,  α4 |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | α1,  α3,  α4 |
| 0 | 0 | 1 | 1 | 1 | 1 | 0 | α1,  α2,  α4 |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | α3 |
| 0 | 1 | 0 | 1 | 1 | 1 | 0 | α2 |
| 0 | 1 | 1 | 0 | 1 | 1 | 0 | α3 |
| 0 | 1 | 1 | 1 | 1 | 1 | 0 | α2 |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | α1,  α3 |
| 1 | 0 | 0 | 1 | 1 | 1 | 0 | α1,  α2 |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | α1,  α3 |
| 1 | 0 | 1 | 1 | 1 | 1 | 0 | α1,  α2 |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | α3 |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 | α2 |
| 1 | 1 | 1 | 0 | 1 | 1 | 0 | α3 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | α2 |

|  |  |  |
| --- | --- | --- |
| (I) | (II) | (III) |
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 0 | 1 | 1 |
| 0 | 1 | 1 |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |
| 1 | 1 | 0 |
| 1 | 1 | 0 |

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In our table we’ve only considered the rows where our knowledge base can be true, i.e. the rows in which B4,1 and B4,3 are true, and B4,2 is false. The rows where the entire knowledge base is true has been marked with green.