UNIVERSITY OF BERGEN, DEPARTMENT OF INFORMATION AND MEDIA STUDIES

**1st Obligatory Assignment**

**INFO 125 – Hallvard Moan Kristiansen**

INSTRUCTIONS: To be completed in groups of at most 2 people. The assignment is obligatory for all students of INFO125. The assignment should be submitted on mitt.uib.

GIVEN ARE THE FOLLOWING SETS:

* Person = {frida,martine,lasse, tord,marija}
* TA = {frida,martine,lasse, tord}
* Classes = {info125,info121}
* Men = {lasse, tord}
* O = {2k | k ∈ N}
* E = {2k +1 | k ∈ N}

1. FIND THE FOLLOWING SETS:

* X = Person \ TA = **marija.**
* Y = Classes×Classes×TA = {< info125, info 125, frida>,< info125, info 121, frida>, < info121, info 125, frida>, < info121, info 121, frida>, < info125, info 125, martine>,< info125, info 121, martine>, < info121, info 125, maride>, < info121, info 121, martine>, < info125, info 125, lasse>,< info125, info 121, lasse>, < info121, info 125, lasse>, < info121, info 121, lasse>, < info125, info 125, tord>,< info125, info 121, tord>, < info121, info 125, tord>, < info121, info 121, tord>}.
* Z = Person∪Men = **frida,martine,lasse, tord,marija**.
* Q = O ∩E =

2. REPRESENT AS LOGIC FORMULAS THE SETS: Person, TA, X and Z

3. PROVE USING TRUTH TABLES THAT:

* The formula a → b is the same as the formula ¬b → ¬a.
* The formula a is the same with the formula ¬(¬a).

4. USING THE DEMORGAN LAWS SHOW THAT

* the formula a ∧b can be expressed with a formula that uses only disjunction and negation operators.

**a and b = ~(~a or ~b)**