# CS360 – Project #1

## Resolution

For Problem 2 (page 10) from Section 7 of
`http://modelai.gettysburg.edu/2011/clue/clue.pdf`,
express all relevant problem facts as a propositional logic knowledge base. Clearly explain the meaning of your propositional symbols. Convert the propositional logic knowledge base to CNF. Use resolution theorem proving to solve the problem by hand. We suggest you read through sections 2-4, as they will help you understand reasoning via resolution.

## Clue

In this project we will model the boardgame Clue[1] by using propositional logic and an off-the-shelf solver (namely, zChaff) to reason about it. You are required to complete Section 8 (pages 15-22) of `http://modelai.gettysburg.edu/2011/clue/clue.pdf`. We suggest you read through sections 1-7, as they will help you understand the game's rules and modeling language.

You will implement four methods in the given ClueReasoner.java (or clueReasoner.py):

- `addInitialClauses`
- `hand`
- `suggest`
- `accuse`

You can download ClueReasoner (as well as SATSolver) from
`http://modelai.gettysburg.edu/2011/clue/index.html`.

To get a perfect grade, your output should be identical to:

```
sc  mu  wh  gr  pe  pl  cf
mu  N   N   N   N   Y   N
pl  N   Y   N   N   N   N
gr  N   N   Y   N   N   N
pe  N   N   N   N   N   Y
sc  N   Y   N   N   N   N
wh  Y   N   N   N   N   N
```

[1] `http://en.wikipedia.org/wiki/Cluedo`

```
kn  N  N  Y  N  N  N  N
ca  N  N  N  Y  N  N  N
re  N  N  N  N  Y  N  N
ro  N  N  Y  N  N  N  N
pi  N  N  N  N  N  N  Y
wr  N  N  N  Y  N  N  N
ha  N  N  N  N  Y  N  N
lo  N  Y  N  N  N  N  N
di  N  N  N  N  Y  N  N
ki  N  N  N  Y  N  N  N
ba  N  N  N  N  N  Y  N
co  N  N  N  N  N  Y  N
bi  N  N  N  N  N  N  Y
li  Y  N  N  N  N  N  N
st  Y  N  N  N  N  N  N
```

### Installing zChaff

ClueReasoner.java (clueReasoner.py) uses SATSolver.java (SATSolver.py) in order to interact with zChaff. You can download zChaff from
`https://www.princeton.edu/~chaff/zchaff.html`.

You then need to install it in the same directory as ClueReasoner and SATSolver (or, alternatively, update zChaff's directory in SATSolver). After untaring it, install it simply by running `make`. Note, in Ubuntu 14.04, you might need to add

```
#include <cstring> to sat_solver.cpp
```

and

```
#include <stdlib.h> to zchaff_dbase.cpp
```

## Submission

You need to submit your solution of the resolution problem as well as your code (ClueReasoner.java or clueReasoner.py) for the CLUE problem through the blackboard system by Monday, Sep. 22nd, 11:59pm.

## Questions

We created a discussion board specifically for this project on the blackboard system. Please also feel free to make use of the TA.