As this was done in a variety of languages, here is the idea. The SemanticTree constructor creates a string of concept names and initializes it to “thing”. It creates a HashSet for concepts with string keys and inserts a concept for thing with no properties or parent.

The read processes the lines, creates new concepts, adds their attributes and values to a property list and links it to parent concept, and incorporates into concept string and HashSet.

The conceptNames function returns the string of concept names.

The attributeValues function gets attributes from concept, then gets any new ones from parent, recursively, finally converting the list of attributes and values to a string.

The third does the same, but does not create a string, but returns true or false if a match.
2. Clue 1
   -marionoatmealraisin
   -marion1st
   greenmultigrain

Clue 2
   charliestevens
   -charliechocolatechip
   -stevenschocolatechip

Clue 3
   -eileenfavorite
   -4thdoublechocolate

Clue 4
   [-1stoatmealraisin elliot2nd]
   [-2ndoatmealraisin elliot3rd]
   [-3rdoatmealraisin elliot4th]
   -4thoatmealraisin
   -elliot1st
   stewartfavorite
   -favoriteoatmealraisin
   -stewartchocolatechip
   -elliotstewart
   -charliestewart

Clue 5
   crofter2nd
   -crofterdamblechocolate
   -1stwhitechocolate

Clue 6
   -eileenoatmealraisin
   fieldoatmealraisin
   sally3rd
   -sallymultigrain

We need clauses of the form [-marion1st, -marion2nd], for all pairs of values,
   plus one clause of form (marion1st, marion2nd, marion3rd, marion4th, marionfavorite)
for each person, 11 clauses for each category below, 5 people (55+55+55) =165
   then repeat for last names, places, and cookie types ===> 660
We need clauses corresponding to AB and BC => AC, BC and AC => AB, AB and AC => BC
   where A, B and C are instances of the various classes:
   e.g., elliot2nd and 2ndoatmealraisin => elliotoatmealraisin
5*5*5 * 3 = 375 for each selection of classes. There are four selection of classes => 1500
3. "You can fool some of the people all of the time, and all of the people some of the time, but you can't fool all of the people all of the time."

(i) if \( \text{canfool}(p,t) \) \( \Rightarrow \text{canfool}(A,t) \)  
if \( \text{canfool}(p,t) \) \( \Rightarrow \text{canfool}(p,f(p)) \)  
\( \neg \text{canfool}(p,t) \) \( \Rightarrow \neg \text{canfool}(B,C) \)

(ii) \( \neg \text{canfool}(\text{Tom, Today}) \)

no resolution possible... A does not match Tom and \( f(p) \) does not match Today
(you can not make any specific conclusions based on these generalities...)

4. (i) \( \text{Meets}(K, \text{LBJ}) \)
\( \text{Meets}(\text{LBJ}, N) \)
\( \text{During}(\text{Pigs}, K) \)
\( \text{During}(\text{Moon}, N) \)
\( \text{Starts}(\text{IK}, K) \)
\( \text{Starts}(\text{ILBJ}, \text{LBJ}) \)
\( \text{Starts}(\text{IN}, N) \)

(ii) \( Ax,y,z [(\text{Meets}(x,y) \text{ and } \text{Meets}(y,z)) \Rightarrow \text{Before}(x,z)] \)
\( A x,y,z,t [(\text{During}(x,y) \text{ and } \text{During}(z,t) \text{ and } \text{Before}(y,t)) \Rightarrow \text{Before}(x,z)] \)

(iii) \( Ax,y [\text{Starts}(x,y) \Rightarrow \text{During}(x,y)] \)

5. (i) 4

(ii) 13 (12 where premise is false, one where both true)

(iii) \([-\text{RW},-\text{CS},-\text{OG}], [-\text{RW},-\text{CS},-\text{BD}] \)

(iv) Converting negation of goal: \([\text{RW}][\text{CS}][\text{OG},\text{BD}]\) and other \([-\text{RW},-\text{BD}] \)
fail to generate [] by resolution.

6. These are common sense inferences, how do you do them?

Thinking of category hierarchies, with associated frames for usual activities, etc.
The following ideas could be formalized as logical implications or as noted above.

(i) Yes, because BestBuy is a retail store and to purchase something you exchange money

(ii) No, as BestBuy is an electronics store that stocks all sorts of electronics items (but not food)

(iii) Yes, as a retail store, the frame about activities there has floor workers and cashiers available
when open and to buy something Mary went to BestBuy when the store was open

(iv) We know that the size of a flat-screen tv is much larger than the usual, default size of a purse
and to carry something in another thing the other thing must be bigger.

(v) No, we know that to go shopping one gets dressed for outside the home and pajamas are
typically only worn inside the home.