Logic, First Course, Winter 2020. Week 1, Section Meeting, Handout.

## Definition of well-formed formula

We start with a basic list of basic propositional formulas a, b, c, ..., p, q, r, ... They are basic in that they do not have any further structure.

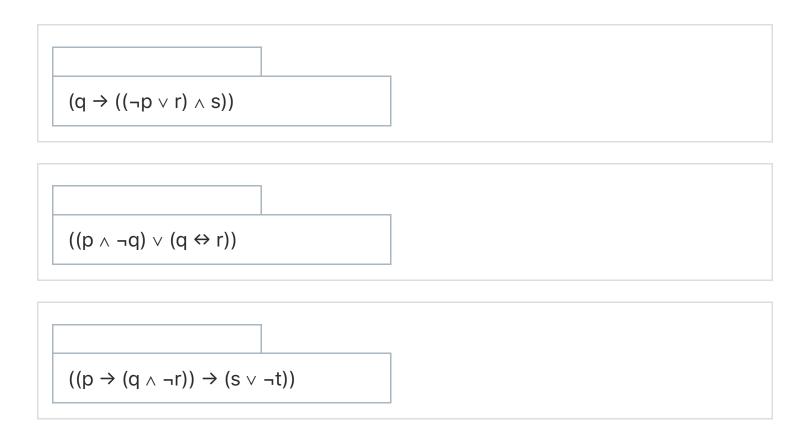
Then we give some rules how to generate more complex well-formed formulas from simpler well-formed formulas, and we say what the *main connective* is of the complex well-formed formula:

- If  $\phi$  is a proposition, then  $\neg \phi$  is a well-formed formula and its main connective is the negation symbol  $\neg$ .
- If  $\phi$  and  $\psi$  are propositions, then  $(\phi \land \psi)$  is a well-formed formula and its main connective is the conjunction symbol  $\wedge$ .
- If  $\phi$  and  $\psi$  are propositions, then  $(\phi \lor \psi)$  is a well-formed formula and its main connective is the disjunction symbol  $\lor$ .
- If  $\phi$  and  $\psi$  are propositions, then  $(\phi \to \psi)$  is a well-formed formula and its main connective is the implication symbol  $\to$ .
- If  $\phi$  and  $\psi$  are propositions, then  $(\phi \leftrightarrow \psi)$  is a well-formed formula and its main connective is the biconditional symbol  $\leftrightarrow$ .

Finally, we say that nothing else is a well-formed formula besides what can be generated in the way described above.

## Practice finding the main connectives





These is a handout written for Logic, First Course, Winter 2020. It is run on the Carnap software, which is an:

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