ASSIGNMENT 1: HISTORY AND INTRODUCTION

MICHAEL BEESON

1. Look up the Wikipedia articles on the following famous logicians, whose most important contribution is listed in parentheses. List these authors in chronological order by date of their most important publication relevant to this course (i.e., do not consider publications in other fields) and give the titles of those publications.

If you view this assignment on a computer, the names below are links to the (biographical) Wikipedia articles; if you printed the assignment you will have to look them up. In many cases the Wikipedia article does not contain the required publication title; that may require more searching, but you will find interesting things along the way. The point of the assignment is not just to come up with the dates and titles, but to pick up some feeling for the history and biography of the subject.

Cantor (the diagonal method)
Peano (the Peano axioms and modern logical notation)
Frege (quantifiers and "logicism")
Russell (attempt to axiomatize all of mathematics),
Zermelo (axiomatic set theory)
Skolem (primitive recursion)

Skolem also developed all the essential tools for the proof of the completeness theorem, and used them to simplify the proof of the Löwenheim-Skolem theorem. Find at least the date of this publication, too. Skolem is the "father of model theory."

Turing (Turing machines) *Hint:* The title of Turing's paper does not mention Turing machines, but it mentions the Entscheidungsproblem, the decision problem for predicate calculus, which Turing solved using Turing machines.

Gödel (the incompleteness theorem)

2. Where and when did Russell and Peano meet, and what happened?

3. Russell mentions a barber who lives in a certain village and shaves every man living in that village who does not shave himself. Is this a paradox? (To avoid a trivial answer, you should also assume that the barber is a man and that nobody is shaved twice.)

4. Let N be the smallest uninteresting positive number. You will surely grant that there are many uninteresting numbers, so N is the least member of some non-empty set. Hence by Peano's axioms that set has a least member, so N is well-defined. But then, the defining property of N makes it a very interesting number indeed, wouldn't you agree? Is this a paradox? Why or why not?