

Math 502 Metamathematic I
Problem Set 6

Due: Friday October 16

- 1) Write register machine program to compute $\max(x, y)$.
- 2) Write a register machine program to compute

$$f(x, y) = \begin{cases} 0 & \text{if } y = 0 \\ \lfloor x/y \rfloor & \text{if } y \neq 0 \end{cases}$$

where $\lfloor r \rfloor$ is the greatest integer $\leq r$ for $r \in \mathbb{R}$.

- 3) a) Suppose $P(\bar{x}, y)$ is a primitive recursive predicate and $g(\bar{x})$ is a primitive recursive function. Define $f(\bar{x}) = 0$ if there is no $n \leq g(\bar{x})$ such that $P(\bar{x}, n) = 1$. Otherwise $f(\bar{x})$ is the least $n \leq g(\bar{x})$ such that $P(\bar{x}, n) = 1$. Prove that f is primitive recursive.

- b) Prove that the function f from problem 2 is primitive recursive.