

COSC 4111/5111 3.0—Winter 2002

Posted: Jan. 19, 2002

Due: Following the reading week [Exact date TBA]

Problem Set No. 1

- (1) Answer the “why” in the note following the corollary on p.79.
- (2) Problem 1 (p.80).
- (3) Prove that $\lambda x, y. \text{gcd}(x, y)$ is in \mathcal{PR} .
- (4) Problems 14, 16, p.81.
- (5) Prove that if a class of functions \mathcal{C} is closed under $(\overset{\circ}{\mu}y)_{\leq z}$ and substitution, then its corresponding class of relations \mathcal{C}_* is closed under $(\exists y)_{\leq z}$.
- (6) Problems 18, 19, 20, p.81.
- (7) Write a loop program which computes $\lambda x. \text{rem}(x, 5)$. The program must only allow instruction-types $X = 0$, $X = X + 1$, $X = Y$ and **Loop** $X \dots \text{end}$. It must *not* nest the Loop-end instruction!
- (8) Write a loop program which computes $\lambda x. \lfloor x/4 \rfloor$. The program must only allow instruction-types $X = 0$, $X = X + 1$, $X = Y$ and **Loop** $X \dots \text{end}$. It must *not* nest the Loop-end instruction!
- (9) Problem 34, p.83.