Mathematical Semantics of Computer Systems, *MSCS* (4810-1168)
Handout for Lecture 11 (2015/01/19)

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1 Today's Agenda

- Reviewing the last report assignment
- Algebraic Semantics
- Categorical Semantics, as a typed λ-calculus and Cartesian closed categories as examples
  - We follow slides by Samson Abramsky (Oxford) found at `www.math.helsinki.fi/logic/sellc-2010/course/LectureIII.pdf`
  - See [3] for further details

2 Review of the Last Report Assignment

- Why are $\exists_f$ and $\forall_f$ (such that $\exists_f \dashv f^{-1} \dashv \forall_f$) denoted in this way?
  - Answer: consider a special case when $f\colon X \times Y \to X$ is a projection. You can even take $X = 1$.

References

[1] S. Awodey. *Category Theory.* Oxford Logic Guides. Oxford Univ. Press, 2006.

[2] M. Barr and C. Wells. *Toposes, Triples and Theories.* Springer, Berlin, 1985. Available online.

[3] J. Lambek and P.J. Scott. *Introduction to higher order Categorical Logic.* No. 7 in Cambridge Studies in Advanced Mathematics. Cambridge Univ. Press, 1986.

[4] T. Leinster. *Basic Category Theory.* Cambridge Univ. Press, 2014.

[5] S. Mac Lane. *Categories for the Working Mathematician.* Springer, Berlin, 2nd edn., 1998.