

Homework (Substitute for Final Exam)

AAA 616: Program Analysis, Spring 2018

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Due: 06/13 (in class)

Problem 1 Implement the shape analysis algorithm in Lecture 8. In OCaml, programs are defined as follows:

```
type a = Ptr of p | Int of int | Add of a * a | Nil
and p = Var of var | Cdr of var
and b = True | False | Not of b | And of b * b | Equal of a * a | IsNil of p
and stmt =
  Assign of p * a
| Skip
| Seq of stmt list
| If of b * stmt * stmt
| While of b * stmt
| Malloc of p
and var = string
```

Implement the function `analysis` that takes a program (`stmt`) and computes possible shape graphs at each program point. This is an open-ended problem, so you can freely define the function as you like. Prepare a 10-minute presentation about your implementation with a demo. There will be no predetermined format, but you must demonstrate that your analysis correctly produces the shape graphs in pages 126—132.