

Homework 3  
SNU 4541.664A Program Analysis  
Spring 2007

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**due: 6/4 13:00**

**Exercise 1** “Interval Abstract Interpreter”

Following the style of lecture note 11.pdf, define an abstract semantic function

$$\hat{\mathcal{F}} \in (Cmd \rightarrow Mem\hat{o}ry \rightarrow Mem\hat{o}ry) \rightarrow (Cmd \rightarrow Mem\hat{o}ry \rightarrow Mem\hat{o}ry)$$

for the simple command language. And, show how the analysis actually works for the following four programs. For each program, show its equations and its iteration steps for their solutions.

- ```
x := 0;
while true
  x := x+1;
```
- ```
x := 0;
while (x < 100)
  x := x+1;
```
- ```
x := 0;
while (x < 100)
  x := x+4
```
- ```
x := 0;
y := 0;
while (x < 100)
  y := y+1;
```