Northwestern University Electrical Engineering and Computer Science EECS336: Design and Analysis of Algorithms Prof. Hai Zhou

Homework 1

Jan. 9, 2006

Handout #2

Due: Jan. 16

You may discuss the assignments with your classmates but need to write down your solutions independently. Be careful with your handwriting. Unclear solutions will be assumed to be wrong.

1. (20 points) (E. W. Dijkstra) Given X>0 and Y>0, what does the following algorithm print? Prove your answer.

```
\begin{split} x &:= X; y := Y; u := X; v := Y; \\ \textbf{while } &(x \neq y) \ \{ \\ & \text{if } (x > y) \ \{ \\ & x := x - y; u := u + v; \\ \} & \textbf{else } \{ \\ & y := y - x; v := v + u; \\ \} \\ \} \\ \textbf{print } &((x + y)/2); \textbf{ print } &((u + v)/2); \end{split}
```

- 2. (10 points) Exercise 0.1
- 3. (15 points) Exercise 0.2
- 4. (15 points) Exercise 0.3
- 5. (20 points) Exercise 1.31
- 6. (20 points) Exercise 1.33