

Assignment 1

Due: Wednesday, September 3, 2008 (before class)

1) (10 pts.) Housekeeping tasks:

1. **Add yourself to the `cs381@cs.purdue.edu` mailing list.** This alias will be used by the instructor and the TAs to send course related announcements to the class. To add yourself, put the command "add my-email-address to cs381" (no quotes) in an e-mail to `mailer@cs.purdue.edu`. You will receive a confirmation e-mail.
2. **Provide a current picture of yourself (head shot):** send a `last_name.jpg` file to `yuan3@cs.purdue.edu`. If you are not able to supply a digital picture, you can submit a hard copy (put your name on the back).
3. **Subscribe to the newsgroup `purdue.class.cs381`.** The newsgroup serves as a discussion forum for course related material of interest to the entire class.
4. **Visit the course website at <http://www.cs.purdue.edu/homes/seh/381webf08/>.** Read the information provided (office hours will be completed during the first week of classes). Which of the following is not considered cheating? Give the reasons for each situation.
 - (a) Finding the solution of a homework problem on a website, copying it by hand making minor modifications, and handing it in without citing the source.
 - (b) Forming a student group with three other students to discuss the problem descriptions and develop obvious/trivial solutions to understand what time bounds are not the expected ones.
 - (c) Giving your assignment to a friend so he can read it over to get an idea on how to solve the problems.

2) (16 pts.)

(i) Use induction to show that for any integer n , $n^2 - n$ is always even.

(ii) Find the following sum and use induction to prove your claim: $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots + \frac{1}{2^k}$

3) (24 pts.) What is the exact value of Total after the execution of each code segment when $n = 2^k$? Explain your answer and express it in terms of n . For code segment 3 you can assume $k = 2^p$.

Code Segment 1

Total=0

for $i = 1$ **to** n **by** 1 **do**

for $j = 1$ **to** n **by** k **do**

 Total = Total+1

Code Segment 2

Total=0

for $i = 1$ **to** k **by** 1 **do**

for $j = 1$ **to** n **by** 2^{i-1} **do**

 Total = Total+1

Code Segment 3

Total=0; $c=n$

while $c > 2$ **do**

 Total = Total+1

$c = \sqrt{c}$