CS 2233 Discrete Mathematical Structures – Fall 08

10/8/08

4. Homework

Due **10/20/08** before class

Please refer to the corresponding exercise sections in the textbook (Rosen, 6th edition).

2.4 (page 160)

(a) (1 point) 4 a

(b) (1 point) 10 b

(c) (1 point) Use index substitution to rewrite the summation in 15.c such that the index starts at 0.

3.2 (page 191)

(a) (4 points) 2 a,b,c,d. Justify all your answers by using the definition of big-Oh to either prove or disprove the claim. You may need to use the fact that $x < 2^x$ which is also equivalent to $\log x < x$.

(b) (2 points) 8 a,b. Justify your answers.

(c) (3 points) 22 a,b,c. Use the definitions of big-Oh, Ω, and Θ to prove or disprove the claims.

(d) (1 point) What is the tight Θ-runtime of the following code snippet? Justify your answer.

```
for(i=n; i>5; i=i/2)
  print("Hello");
```

4.1 (page 279)

(a) (3 points) 4 a-e

(b) (3 points) 20 (Use induction on n to prove this claim.)

Extra credit: The question below is for extra credit. Any points earned here may be applied towards any other homework (in order to increase the homework score to $\geq 60\%$).

4.2 (page 291)

(a) (10% points) 38 *(Hint: Use strong induction on the number n of cells. Draw an example picture first, then try to identify "recursive" subcases with fewer cells that you can use the inductive hypothesis on. This is similar to the proof for tiling a square with L-shapes.)*