Organic Chemistry
Nomenclature Guidelines

(A) From structure to name

1. Determine if the compound is likely named with a common name (e.g. toluene).

2. If the compound cannot be named "commonly", then the substitutive name of an organic compound can be derived by identifying its principal group and principal chain. The principal group is identified by the presence of a priority group as follows (listed from highest to lowest priority) -- **see inside cover of your text**:

Carboxylic acid
Anhydride
Ester
Acid halide
Amide
Nitrile
Aldehyde
Ketone
Alcohol/phenol
Thiol
Amine

3. In order to derive the parent name, apply the following criteria (in order), find the chain of carbon atoms in a molecule that contains:

- the maximum number of substituents including the priority group(s)
- the maximum number of double and triple bonds
- the maximum length
- the maximum number of double bonds
- the maximum number of substituents

4. Use that chain to derive the parent name for the molecule according to the base name set in Table 2.4 of your Jones text. If there is more than one chain of equal length, then choose the one with the greater number of branches. If no priority group exists, simply name as a substituted hydrocarbon. If a priority group is present, then use an appropriate suffix (**see the appropriate section relating to the base functional group in your Jones text --- you can also consult the inside front cover of the text**).

5. Number the atoms in the parent chain starting with the lowest number for the highest priority group. If no priority groups are present then start at the end nearest the first branch point (in order to derive the lowest number combination). If there is branching an equal distance from both ends, then start numbering from the end nearer to the second branch point. You want to achieve the lowest possible number combination.

6. Identify each substituent (branch) by name and number. If there is more than one substituent on the same carbon, assign them all the same number. Be on the lookout for

"complex" substituents (isopropyl, sec-butyl, etc.) as noted in Chapter 2 of your Jones text (e.g. Figures 2.32 and 2.37).

7. Arrange and cite the branches in alphabetical order. All prefixes except tert-and sec- shall follow alphabetical order.

3-isopropyl-2-methylhexane is correct (iso before methyl)
3-tert-butyl-2-ethylcyclohexane is also correct (butyl, ignore tert, before ethyl)
3-sec-butyl-2,2-dimethylcyclopentane (butyl, ignore sec, before di)

8. Use hyphens to separate different prefixes and commas to separate numbers.

9. If more than one identical substituent is present, use the prefixes di-, tri-, and tetra-.

(B) Special rules

1. Rules are essentially the same for cyclic hydrocarbons --- except when the ring has significantly fewer carbons than a side chain. In this case, the side chain will get the parent name (see Table 2.6 of your Jones text).

2. For alkenes and alkynes, you want to find the longest chain containing the greatest number of pi bonds. This chain will be used to derive the parent name (see Section 3.4 of your Jones text).

3. For alkenes, use the E/Z designation to assign stereochemistry about geometric double bonds (see Sections 3.3 and 3.5 of your Jones text).

4. For compounds containing asymmetric carbons, use the R/S designation to assign stereochemistry (see Section 4.4 of your Jones text).

5. The nomenclature for aromatic hydrocarbons is completely different and will be treated separately (see Sections 13.8 thru 13.11 of your Jones text).

(C) From name to structure

1. Find the parent name and draw its basic (parent chain) structure.

2. List out all substituents and their positions.

3. Identify any priority groups and place them in their appropriate positions on the "parent chain".

4. Number the "parent chain" and place all of the substituents in their appropriate locations.

5. Massage the drawing to account for stereochemical restrictions (E/Z or R/S configurations).