Nomenclature

\[ \text{C} \quad \text{#C} \quad \text{used mainly for common names} \]

- \text{C} 1°
  - 1 meth-
  - 2 eth-
  - 3 prop-
  - 4 but-
  - 5 pent-

2-C-R 3°
  - 6 hex-
  - 7 hept-
  - 8 oct-
  - 9 non-
  - 10 dec-

Systematic Naming Process

1. Find longest continuous chain containing pre-functional group. The FG gets the lowest number. If there are no functional groups, the substituents get lowest numbers. In this case, look for overall lowest numbers.

Functional Groups: -CH - NH₂
Alphabetize: iso, neo, cyclo
Don't Alphabetize: di, tri, sec, tetra

Alkyl Halides

Common: alkyl group + halide
IUPAC: halide + hydrocarbon

\[ \begin{align*}
\text{CH}_3\text{CHBr} & \quad \text{C} = \text{isopropyl bromide} \\
\text{CH}_3 & \quad \text{I} = \text{2-bromopropane}
\end{align*} \]

Amines Functional Group: amine

Common: alkyl substituents in ABC order amine (one word)
IUPAC: Find longest chain w/ N = parent chain alkyl & amine - put subst. in order (ABC)
IF subst. (Shorter than parent chain) attached to N, use “N” as a #:  \[ \begin{align*}
\text{CH}_3\text{CH}_2\text{CH}_2\text{NCH}_3 & \quad \text{4-chloro-N,N-dimethyl-2-pentanamine}
\end{align*} \]

Ethers

Common → symmetric
  - di ether
  - alkyl sub
  - ether

Common → unsymmetric
  - alkyl sub
  - alkyl sub,
  - ether

IUPAC: ether as substituent
  - shortest → **Alk**X "oxy"
  - ABC order w/ ether subst.

\[ \begin{align*}
\text{CH}_3\text{CH}_2\text{OCH}_3 & \quad \text{C} = \text{ethyl methyl ether} \\
\text{Br} & \quad \text{I} = \text{1-methoxy ethanol}
\end{align*} \]

Alcohols & Functional Group = "ol"

Common: alkyl group as substituent + alcohol
IUPAC: The #C prefix ending w/ "ol"
  - name = alkanol

\[ \begin{align*}
\text{CH}_3\text{CH}_2\text{CH}_3 & \quad \text{C} = \text{isopropyl alcohol} \\
\text{OH} & \quad \text{rubbing alcohol}
\end{align*} \]
Systematic Nomenclature of Organic Compounds

1. Find the longest continuous carbon chain (parent chain).
   a. If there is a functional group (i.e. carbon-oxygen double bond, an alcohol, a carbon-carbon multiple bond or an amine) it must be on or part of the parent chain.
   b. If there is a ring in the compound either it will be the parent chain or the non-ripped chain is the parent chain BUT NEVER both together can be the parent chain.
   c. If there are two or more chains of equal length, pick the one with the greatest number of substituents.

2. Number the carbons in the parent chain.
   a. If there is a functional group always give it the lowest possible number (on a ring the lowest number is always #1). If the functional group gets the lowest number from either end then consider the lowest number for the substituents.
   b. If there is more than one functional group the priority is carbonyls > alcohols > carbon-carbon multiple bonds > amines. If you have a carbon-carbon double bond and a carbon-carbon triple bond whoever gets the lowest number in the chain wins. If both should get the same number the double bond gets priority.
   c. If there are no functional groups, give the substituents the lowest possible numbers.
   d. If you get the same numbers from either end then give the alphabetically first substituent the lowest number.

3. Name your compound.
   a. If the compound is a specific configuration or geometry (cis/trans, E/Z or R/S) this is indicated first.
   b. The first name is your substituents in alphabetical order. Only alphabetize the prefixes iso, neo and cyclo. Carbon substituents are named by adding the -yl suffix to the stem name. Halogen substituents are given the suffix -o. List the position/s followed by the substituents name. I.e. #-subst or #,#-disubst. If a substituent is on a N use an N as the number. i.e. N-subst. Note hyphens between number and letters, and commas between two or more numbers. Use the greek prefixes (di, tri, tetra etc.) when there's more than one identical substituent.
   c. The last name of the compound is the name of your parent chain. The stem of the word tells you the length of the parent chain and the suffix of the parent name should reflect the type of compound your naming. If the parent chain is cyclic you must include the prefix cyclo. If your parent chain has a functional group in a position that is not obvious a number must be given to indicate its position.

Suffixes

1. Alkanes - suffix -ane
2. Alkenes - suffix -ene
3. Alkynes - suffix -yne
4. Alcohols on alkane - suffix -anol
5. Alcohols on alkene - suffix -enol
6. Alcohols on alkyne - suffix -ynol
7. Aldehydes - suffix -onal
8. Ketones - suffix -onone
9. Carboxylic acid - suffix -anoic acid
10. Esters - suffix -onate
11. Amines - suffix -amine

Stems

1C - meth-
2C - eth-
3C - prop-
4C - but-
5C - pent-
6C - hex-
7C - hept-
8C - oct-
9C - non-
10C - dec-
11C - undec-
12C - dodec-