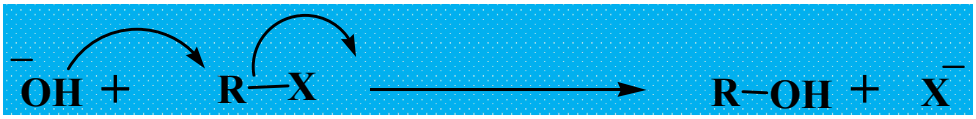
Types of Reagents

1) Nucleophiles or nucleophilic reagents (electron donors): are nucleus loving reagents which in a reaction donate electrons to share by its with the center attached

A- Negatively charged anions as OH^-, CN^-, RO^-



B- Neutral molecules having lone pair of electrons

$R_3N:$ $H_3N:$ $H_2O:$ $R_2O:$ $R_2S:$

2) Electrophiles or Electrophilic reagents (electron acceptors): electron loving reagents

- **Positively charged cations**

Such as, H^+, NO_2^+, X^+, CH_3^+

- **Neutral molecules (electron deficient)**

Such as $FeCl_3$, $AlCl_3$, C=O,

Organic Compounds

The main classes of compounds that are synthesized by the reactions you will study, are alkanes, alkenes, alkynes, alkyl halides, alcohols, aldehydes , ketones and carboxylic acids.

Alkanes are composed of only carbon atoms and hydrogen atoms and contain only single bonds.
Compounds that contain only carbon and hydrogen are called hydrocarbons, so an alkane is a hydrocarbon that has only single bonds.
Alkanes in which the carbons form a continuous chain with no branches are called straight-chain alkanes

Nomenclature of alkanes

If you look at the relative numbers of carbon and hydrogen atoms in the alkanes listed in the following table, you will see that the general molecular formula for an alkane is C_nH_{2n+2} where *n* is any integer.

So, if an alkane has one carbon atom, it must have four hydrogen atoms; if it has two carbon atoms, it must have six hydrogens.

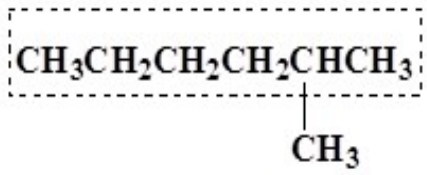
We have seen that carbon forms four covalent bonds and hydrogen forms only one covalent bond.

No. of carbons	Structure	Name
1	CH_4	Methane
2	CH_3CH_3	Ethane
3	$CH_3CH_2CH_3$	Propane
4	$CH_3CH_2CH_2CH_3$	Butane
5	$CH_3CH_2CH_2CH_2CH_3$	Pentane
6	$CH_3CH_2CH_2CH_2CH_2CH_3$	Hexane
7	$CH_3CH_2CH_2CH_2CH_2CH_2CH_3$	Heptane
8	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$	Octane
9	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$	Nonane
10	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$	Decane

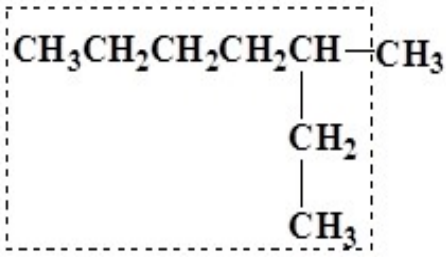
Rules of nomenclature of alkanes

1. Determine the number of carbons in the longest continuous carbon chain.

This chain is called the parent hydrocarbon. The longest continuous chain is not always a straight chain; sometimes you have to "turn a corner" to obtain the longest continuous chain.

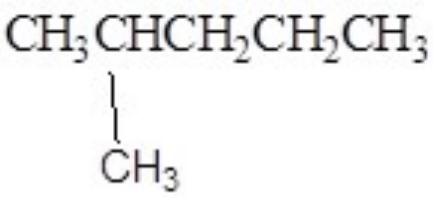


Longest chain (parent) is hexane

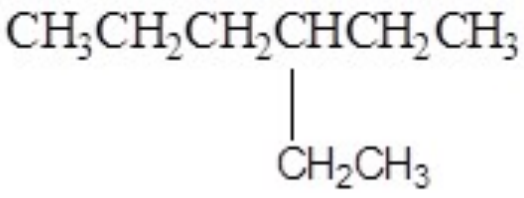


Longest chain (parent) is heptane

2. The name of any alkyl substituent that hangs off the parent hydrocarbon is cited before the name of the parent hydrocarbon, together with a number to designate the carbon to which the alkyl substituent is attached.
The chain is numbered in the direction that gives the substituent the lowest number.

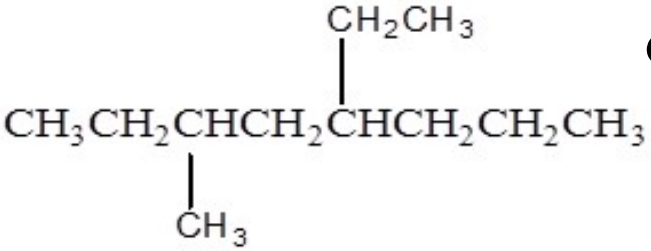


2-methylpentane

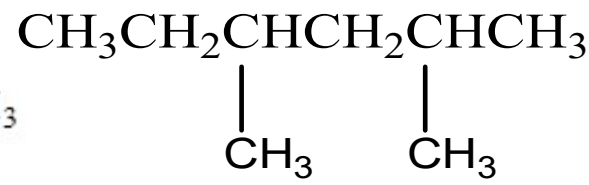


3-ethylhexane

3- If more than one substituent is attached to the parent hydrocarbon, the chain is numbered in the direction that will result in the lowest possible number in the name of the compound.
The substituents are listed in alphabetical.
If two or more substituents are the same, the prefixes "di," "tri," and "tetra"are used to indicate how many identical substituents the compound has

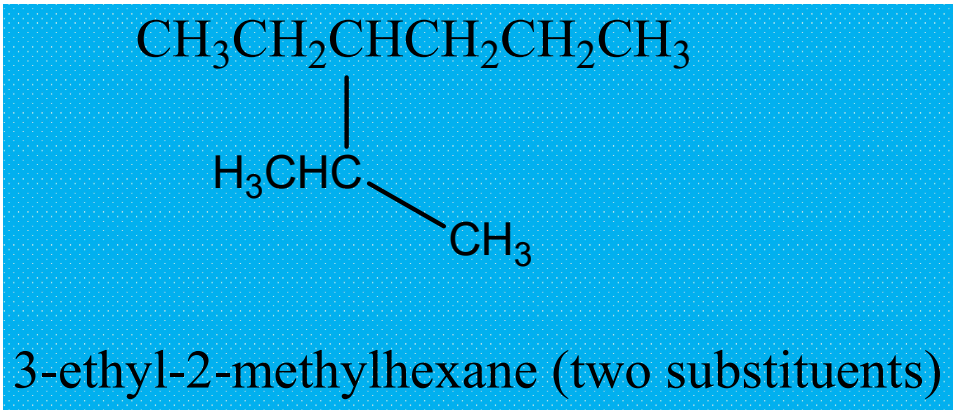


5-ethyl-3-methyloctane
not
4-ethyl-6-methyloctane
because 3 < 4



2,4-dimethylhexane

4- If a compound has two or more chains of the same length; the parent hydrocarbon is the chain with the greatest number of substituents



3-ethyl-2-methylhexane (two substituents)