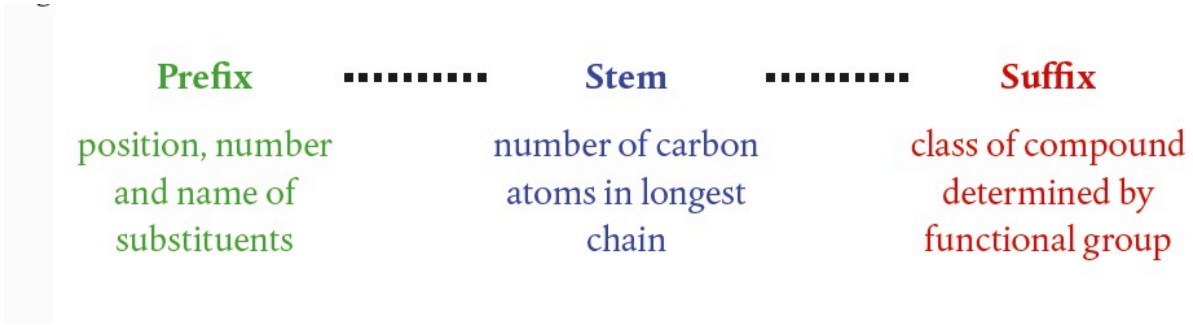
Topic 10

这章比较的偏应用，所以可以依托题目来解决，首先是命名规则（IUPAC)
首先是按照这个顺序写每个奇奇怪怪成分的名字：

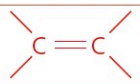


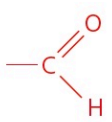
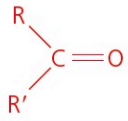
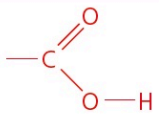
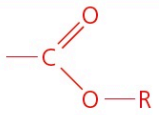
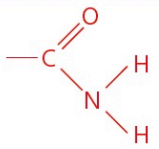
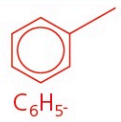
接下来是具体的解释：

Stem: 同一条线上（最多的）碳原子个数

Number of carbon atoms in longest chain	Stem in IUPAC name	Example of compound
1	meth-	CH_4, methane
2	eth-	C_2H_6, ethane
3	prop-	C_3H_8, propane
4	but-	C_4H_{10}, butane
5	pent-	C_5H_{12}, pentane
6	hex-	C_6H_{14}, hexane

Functional group （悄悄的表示在databooklet上大部分都有，主要是要记住class的名称）

Class	Functional group	Name of functional group	Suffix in IUPAC name	Example of compound	General formula
alkane			-ane	C_2H_6, ethane	C_nH_{2n+2}
alkene		alkenyl	-ene	$H_2C{=}CH_2$, ethene	C_nH_{2n}
alkyne	—C≡C—	alkynyl	-yne	HC≡CH, ethyne	C_nH_{2n-2}
alcohol	—OH	hydroxyl	-anol	C_2H_5OH, ethanol	$C_nH_{2n+1}OH$
ether	R—O—R′	ether	-oxyalkane	$H_3C—O—C_2H_5$, methoxyethane	R—O—R′

aldehyde		aldehyde (carbonyl)	-anal	C_2H_5CHO, propanal	R—CHO
ketone		carbonyl	-anone	CH_3COCH_3, propanone	R—CO—R′
carboxylic acid		carboxyl	-anoic acid	C_2H_5COOH, propanoic acid	$C_nH_{2n+1}COOH$
ester*		ester	-anoate	$C_2H_5COOCH_3$, methyl propanoate	R—COO—R′
amide		carboxyamide	-anamide	$C_2H_5CONH_2$, propanamide	
amine	$-NH_2$	amine	-anamine	$C_2H_5NH_2$, ethanamine	
nitrile	$-C\equiv N$	nitrile	-anenitrile	C_2H_5CN, propanenitrile	
arene		phenyl	-benzene	$C_6H_5CH_3$, methyl benzene	

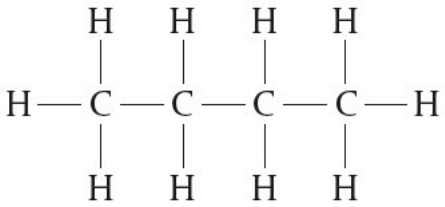
最后怼上side chain

Class	Functional group	Name of functional group	Prefix in IUPAC name	Example of compound
alkane			methyl, ethyl, propyl, etc.	$CH_3CH(CH_3)C_2H_5$, 2-methylbutane $CH(C_2H_5)_3$, 3-ethylpentane $CH(C_3H_7)_3$, 4-propylheptane
halogenoalkane	—F, —Cl, —Br, —I	halogeno	fluoro, chloro, bromo, iodo	C_2H_5Cl, chloroethane $CH_3CH_2BrCH_3$, 2-bromopropane
amine	$-NH_2$	amine	amino	$CH_2(NH_2)COOH$, 2-aminoethanoic acid

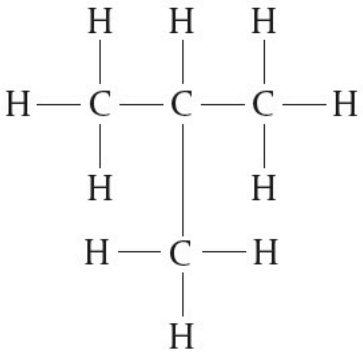
done.

和其他的topic一样，这章也不出意外的有几只幺蛾子…

第一只叫做Isomer，天地良心记住中文就差不多了：同分异构体。也就是 molecular formula长一样structural formula不一样的



butane,
boiling point –0.5 °C



2-methylpropane,
boiling point –11.7 °C

物理性质会相差比较大……

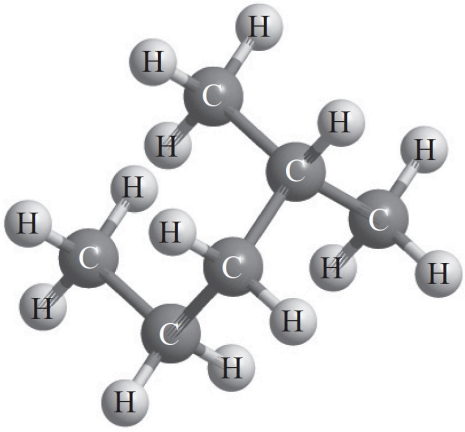
有些题会让你数，那就真的只能数（第三声）数（第四声）了。

第二个不算坑，但是被老师坑了很多次，是时候解决了！

Primary carbon atom: 连着functional group和至少两个H的C
Secondary carbon atom: 连着functional group，一个H，两个CH3的C
Tertiary carbon atom: 连着functional group和3个CH3而不是H的C

暂！时！就！这！些！（下面是并不多但是存在的题目）

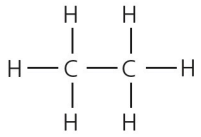
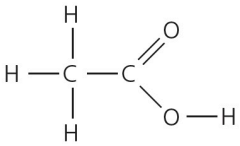
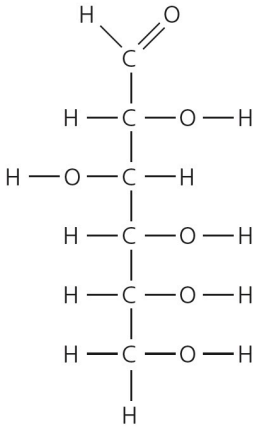
这张真的很坑，请大声告诉我它的名字——



(2-methylpentane)

26. How many non-cyclic structural isomers exist with the molecular formula C_5H_{10}?

- Isomer 怎么数啊！！救命！！
  - 老老实实画图吧。
- Determine the structural formula -A representation of the molecule showing how the atoms are bounded to each other.

Compound	Ethane	Ethanoic acid	Glucose
Empirical formula	CH_3	CH_2O	CH_2O
Molecular formula	C_2H_6	$C_2H_4O_2$	$C_6H_{12}O_6$
Full structural formula			
Condensed structural formula	CH_3CH_3	CH_3COOH	$CHO(HCOH)_4CH_2OH$

13. The following compounds have similar molar masses:

CH_3CH_2COOH, $CH_3CH_2CH_2CH_2OH$ and $CH_3CH_2CH_2CH_2CH_3$

What is the order of **increasing** boiling points?

A. $CH_3CH_2CH_2CH_2OH < CH_3CH_2COOH < CH_3CH_2CH_2CH_2CH_3$

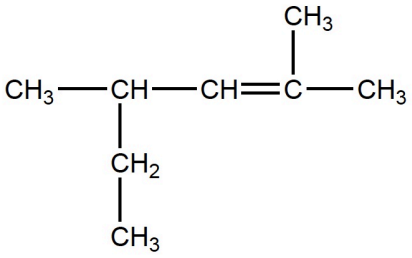
B. $CH_3CH_2COOH < CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH$

C. $CH_3CH_2COOH < CH_3CH_2CH_2CH_2OH < CH_3CH_2CH_2CH_2CH_3$

D. $CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH < CH_3CH_2COOH$

- Boiling point of a homogeneous series
  - 是一个随着C个数的增加上升的过程

27. Applying IUPAC rules, what is the name of the compound?



A. 1-ethyl-1,3-dimethylbut-2-ene

B. 2-ethyl-4-methylpent-3-ene

C. 2-methyl-4-ethylpent-3-ene

D. 2,4-dimethylhex-2-ene

D.

简答题

1. M13 TZ1 PP2 Q8

Three features of a homogenous series

same functional group / same general formula;

difference between successive members is CH2;

similar chemical properties;

Do not accept “same” chemical