Recursion:

When a function calls itself then that function is known as recursive function and that concept is known as recursion

In [2]:
```
1: Linear recursion
2:binary recursion
```

15

In [ ]:
```
memory in os
heap--objects are stored
stack-- function calling and variables
data members/instructions
```

In [ ]:
```
Iteration vs Recursion
1: Recursion is stored in stack memory thatswhy its is slower than iteration methods.
2: Recursion takes more time and memory.
```

In [ ]:
```
#factorial of a number using recursion:
def recur_factorial(num):
    if num==1 or num==0:
        return 1
    else:
        return num*recur_factorial(num-1)
num=int(input())
print(recur_factorial(num))
```

3000

In [2]:
```
#factorial of a number using iteration:
def iter_factorial(num):
    fact=1
    for i in range(1,num+1):
        fact=fact*i
    return fact
num=int(input())
print(iter_factorial(num))
```

5000

4228577926600554352220106420023358440539078667462664674884978240218135805270810820069089904787170638753708474665730068544587848606668381273633721089
3772787631279390363058462160643904478986982239871929708896211612652968321775500399242196837031469072644728787897990404754884162215226671928410969236
9104495659717363529484002238403811206448202308576711045023061748947554283097617817240408053248099278093287840554861993645482912118762582488021891739
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2556741930917055172805200236075085991197635228755907902043369743123506916831211924495971556267407521462198986233088625998302859864857877874944596311528697088467100462684236481789899005456909861391613218344174148807186234448114831209490361196546827276775561788682872026910481409245641034183559756042764581615131785759016610717825441569808833593727299956037137120047104943765629114248860535299499642300699972204918120100819059439140675053265004775533850899097945101551091486907004407119572336026243368132330218709287691968066565697527904222582678415610833764257810326292026872110702746813943511286015023261906499591718973641767843649121970910984040454518953589591038041769419566578348220711749105512752639148381172052604826965162642710094919393332661030104360530459117014557209584714353721948246686793467375904872268313410207860903657108806376618024974906818607581310707740168218080859455264645417140927746923006629751134604417456794673582878226162958424867515373917224178783105429858245117575511884506574246087571746608002385883789423962478687615017657725898321128632295537044902516387925127590841791744640466913531047347984464996154595542013996317357476301740036796192919429319042901907628554456261767417099538161133983711769934554744990856419877765994515825615490038565621529124942706535571425117373238072326329581217979166796923296807096923901003255577489055099807487061047230646195984955239657612208673866514171699307557691897902675157342075840796345338446350859654907273263219105040642897139626245051620646694680988699171221274045040268492326624176013291022786668727030528470945252682549661772499645206699836925910609889408263740104349483759112645582228060636134113441316717169934353664284928294436417496158819366138825557487709937000454759376984514903443452117140605940399162684446976618213874707053255957793319646099666214537756493541416970856238921477322286550718249043001618614291926045230767067211420961767214704123616107412041236130124720007943758647492753665149532164780849075146330071016691312826288658369883631210876071042751607334834778841497967324270804108607618412818880307115098982135338400610652147080746887476099542747367350945155359976904036735358551052571682650317682401543999341486239233198143257918213932189884045086501361099980983839931109963556981328001049713588596312113185380120504678764291066936560043730563343194879049898524701293300789344532868134653367087548900411309198167637409041510337597307246885839246941715548295730750610850588158195952899266022562690034395733134506697295251152306686962279209477799743365744726734714089280714112383880826933773780772931041176751363947620061085804059601963905801576100233746386935222838580145344368717453513614306035483997907833072676367209990807728273558543488032606674725370077854645677611818073674243673917698637580721458597904537965929379491783890192611063531475563311927746150389219290616780607901383451137066306068240967928572601761550659150663098092094637338500502994637050053900900896761779686853778966713092104068160007162830143449786002240610200644065587068219671069606097259321868135970360677059467206113001058025886000037756265821577240767662121537929317459897716433314715633111927461503891229061678060790138345113756660368643762617919988551514368126613731991210323546978675642121062489900553564022923458312641310383634167817199083541404117177401889506066741198348143345444424719143682822565438004780039957592241707180267064687545421162695874679539854078926049591180761315499652736211235408801669902867449859298183140089650797304301289365789846514403817511499652736211235408801669902867449859298183140089650797304301289365789846514403817511499652736211235408801669902867449859298183140089650797304301289365789846514403817511499652736211235408801669