**User-defined Functions & Recursive Functions**

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|  | **FindtheFactor** |
| **ProblemStatement:**  Determinethefactorsofanumber(i.e.,allpositiveintegervaluesthatevenlydivideinto a number) and then return the pth element of the list, sorted ascending. If there is no pth element, return 0.  Example n = 20  p=3  Thefactorsof20inascendingorderare{1,2,4,5,10,20}.Using1-basedindexing,ifp=  3,then4isreturned.Ifp>6,0wouldbereturned.  FunctionDescription  CompletethefunctionpthFactorintheeditorbelow.  pthFactor hasthefollowingparameter(s):  int n: the integer whose factors are to be found int p: the index of the factor to be returned  Returns:  int: thelong integervalueofthepth integerfactorofnor,if thereisnofactorat that index, then 0 is returned  Constraints 1≤n≤1015  1≤p≤109  InputFormatforCustom Testing  Inputfromstdinwillbeprocessedasfollowsandpassedtothefunction. Thefirstlinecontainsanintegern,thenumbertofactor.  Thesecondlinecontainsanintegerp,the1-basedindexofthefactortoreturn.  SampleInput  STDIN Function    10 → n=10  3 → p=3  Sample Output 5  Explanation  Factoringn=10resultsin{1,2,5,10}.Returnthep=3rdfactor,5,astheanswer. | |

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| **Program:**  **/\***  **\*Complete the 'pthFactor' function below.**  **\***  **\*The function is expected to return a LONG\_INTEGER.**  **\* The function accepts following parameters:**  **\* 1. LONG\_INTEGER n**  **\*2. LONG INTEGER P**  **\*/**  **long pthFactor(long n, long p)**  **{**  **int count=0;**  **for(long i=1;i<=n; ++i)**  **{**  **if(n%i==0)**  **{**  **count++;**  **if(count==p)**  **{**  **return i;}}}**  **return 0;**  **}** |

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|  | **4thBit** |
| **ProblemStatement:**  A binary number is a combination of 1s and 0s. Its nth least significant digit is the nth digit starting from the right starting with 1. Given a decimal number, convert it to binary and determine the value of the the 4th least significant digit.  Example number=23   * Convertthedecimalnumber23tobinarynumber:2310=24+22+21+20=   (10111)2.   * Thevalueofthe4thindexfromtherightinthebinaryrepresentationis0.   FunctionDescription  CompletethefunctionfourthBit intheeditorbelow.  fourthBithasthefollowingparameter(s): int number: a decimal integer  Returns:  int:aninteger0or1matchingthe4thleastsignificantdigitinthebinary representation of number.  Constraints  0≤number<231  InputFormatforCustom Testing  Input from stdin will be processed as follows and passed to the function. The only line contains an integer, number.  SampleInput  STDIN Function    32 → number=32  Sample Output 0  Explanation   * Convertthedecimalnumber32tobinarynumber:3210=(100000)2. * Thevalueofthe4thindexfromtherightinthebinaryrepresentationis0. | |

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| **Program:**  **/\***  **\* Complete the 'fourthBit' function below.**  **\* The function is expected to return an INTEGER.**  **\* The function accepts INTEGER number as parameter.**  **\*/**  **int fourthBit(int number)**  **{int binary [32];**  **int i=0;**  **while(number>0)**  **{**  **binary[i]=number%2;**  **number/=2;**  **i++;**  **}**  **if(i>=4)**  **{**  **return binary[3];**  **}**  **else**  **return 0;**  **}** |

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|  | **ThePowerSum** |
| **ProblemStatement:**  Findthenumber of ways thatagiven integer,X, can beexpressedas the sum of theNth powers of unique, natural numbers.  For example, if X =13 and N= 2, we have to find all combinations of unique squaresadding up to 13. The only solution is 22+ 32.  FunctionDescription  CompletethepowerSumfunctionintheeditorbelow.Itshouldreturnaninteger that represents the number of possible combinations.  powerSum has the following parameter(s): X: the integer to sum to  N:theintegerpowertoraisenumbersto  InputFormat  The first line contains an integer X. ThesecondlinecontainsanintegerN.  Constraints  1≤X≤1000  2≤N≤10  OutputFormat  Outputasingleinteger,thenumberofpossiblecombinationscalculated.  SampleInput 10  2  Sample Output 1  Explanation  IfX=10andN=2,weneedtofindthenumberofwaysthat10canberepresentedasthe sum of squares of unique numbers.  10=12+32  Thisistheonlywayinwhich10canbeexpressedasthesumofuniquesquares. | |

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| **Program:**  **/\***  **\* Complete the 'powerSum' function below.**  **\***  **\*The function is expected to return an INTEGER.**  **\*The function accepts following parameters:**  **1. INTEGER X**  **2. INTEGER n**  **\*/**  **int powerSum(int x, int m, int n)**  **{**  **int power=1;**  **for(int i=0;i<n;i++)**  **power\*=m;**  **if (power==x)**  **return 1;**  **if (power>x)**  **return 0;**  **return powerSum(x-power,m+1,n)+powerSum(x,m+1,n);**  **}** |

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|  | **HacktheMoney** |
| **ProblemStatement:**  Youareabankaccounthacker.Initiallyyouhave1rupeeinyouraccount,andyouwant exactlyNrupeesinyouraccount.Youwrotetwohacks,firsthackcanmultiplytheamount ofmoneyyouownby10,whilethesecondcanmultiplyitby20.Thesehackscanbeused any number of time. Can you achieve the desired amount N using these hacks.  Constraints:  1<=T<=100  1<=N<=10^12  Input   * ThetestcasecontainsasingleintegerN.   Output  Foreachtestcase,printasinglelinecontainingthestring"1"ifyoucanmakeexactlyN rupees or "0" otherwise.  SAMPLE INPUT 1  SAMPLEOUTPUT 1  SAMPLE INPUT 2  SAMPLEOUTPUT 0 | |

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| **Program:**  **/\***  **\* Complete the 'myFunc' function below.**  **\***  **\* The function is expected to return an INTEGER.**  **\* The function accepts INTEGER n as parameter.**  **\*/**  **int myFunc(int n)**  **{**  **if(n==1)**  **return 1;**  **if(n<1)**  **return 0;**  **if(n%10==0 && myFunc(n/10))**  **return 1;**  **if(n%20==0 && myFunc(n/20))**  **return 1;**  **return 0;**  **}** |

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