Cognizant is kick-starting its recruitment process for 2021 pass-outs this year. This document will detail the Cognizant Recruitment Process, Eligibility Criteria, Test Pattern and Syllabus as well as Most Asked Cognizant Questions from Previous Years.

CONTENTS PAGE

A. Cognizant Roles & Packages

There are two roles that Cognizant is recruiting 2021 pass-outs for, this year. They are as follows.

GenC:

- INR 4,50,500 p.a. (Post Probation)
- INR 4,01,986 p.a. (Initial compensation)

GenC Next:

- INR 6,75,942 p.a.

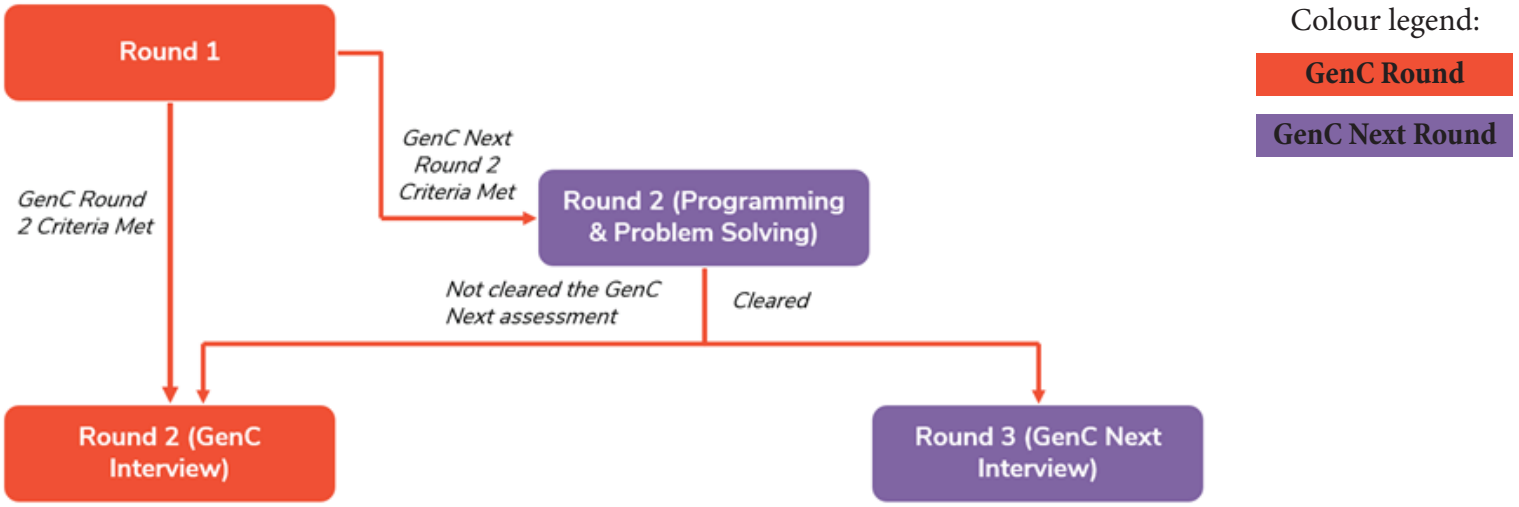
Both of the packages begin with a common round in the recruitment process. Candidates' performance in various rounds dictates what package they get. The Recruitment Process is explained in detail in the later part of this document.

B. Cognizant Eligibility Criteria

Year of passing out	2021
Degrees and streams	BE, B Tech, ME, M Tech, MCA and MS Software Engineering (the latter being the 5-year integrated course only)
Academic requirement	Consistent academic record of minimum 60% in X, XII, Diploma, UG and PG (all subjects will be taken into consideration and calculated as below) Aggregate % = sum of all subject marks scored / total no. of subjects (as of last semester results declared)
Academic gap	Max of 2 years' gap in education
Backlogs	No active backlogs at the time of the recruitment process and onboarding
Colleges allowed	Select colleges that are invited by Cognizant. Please check with your Training & Placement Officer to find out if yours is
Other important details	Students must have: - Resume (max of 2 pages) with high resolution passport size photographs embedded (both ears must be visible, with light background) - All academic mark sheets and certificates for verification - Aadhar Card and Passport (front and back page), and PAN Card (if available)

C. Recruitment Process & Test Instructions

Here is the official recruitment process for Cognizant 2021 Pass-Outs Recruitment. This flow-chart will detail how the selection process works for both the packages.



Round 1 is expected to have:

o Quantitative Aptitude
o Logical Reasoning
o Writing Ability
o Debugging (Automata Fix). Usually Automata Fix, which is used in other companies that use the AMCAT platform have 7 questions in 20 minutes. The 7 questions can be solved in C/ C++/ Java and will be of:
- Syntax Error debugging
- Logical Error debugging
- Code Re-use (Code Completion)

As per the grapevine and sources close to FACE Prep, the Verbal Ability (which featured in previous years) is no longer going to be a part of the test this year.

GenC Next Round 2 (Programming & Problem Solving) is expected to have:

o 2 Coding Questions (1 Medium and 1 Hard)
o The first question is expected to test you on Fundamentals of Programming, while the second requires application of Problem Solving, Data Structures and Algorithms.

GenC Interview will test students on:

o Technical Ability
o Cognitive Ability
o Right attitude

GenC Next Interview will test on:

o Problem Articulation
o Algorithmic capabilities
o Programming Concepts
o Cognitive Ability
o Right attitude

The test is going to be conducted on the Aspiring Minds (AMCAT) platform.

Official Cognizant Test Instructions

- The candidates need to take the test on a computer/laptop system, equipped with a working Web-Cam (external or built-in) and smooth internet connectivity throughout the test session.
- Candidates are advised to take the test in all fair means.

• The test system is built with various artificial intelligence mechanisms to track malpractice and any extended help. Any candidate found to be using unfair means would be promptly disqualified from the recruitment process without notice.
• Other than the intended candidate, should an image of any other person be captured in the vicinity during the test process, the candidate's test will be disqualified. This disqualification may happen at any stage of the process and is solely a discretion of the Cognizant team.
• Do not try to click 'Print Screen' or Copy the content while the test is in progress. The
system will disqualify the candidate instantly. Use of mobile phones and cameras during the entire duration of the test is strictly prohibited.
• There should not be any hindrance to the Web-Cam's lenses. It should not be covered with any object and should always have the candidate right in front of it.
• While taking up the online test, candidates are advised not to move out of the test screen, e.g., Do not open another tab or application like notepad, excel or web browsers like Google, etc. The Test will be locked permanently if a candidate is found switching through windows while taking the Test.
• In case the test stops/halts due to an Internet or electricity failure, you will be able to resume your assessment from the same point you got logged out, without losing any time.
• Wait for 5 minutes, login again using the same credentials, and click on 'Resume Incomplete Test'. You will have to select your name and continue attempting the test.
• After you login into the test, you have to finish the test within 4 hours. Please ensure that you have smooth electrical and internet connectivity to complete the test in one go.

General Instructions:
• There is no negative marking.
• You have to answer all the questions mandatorily, i.e., you cannot skip any question.
• Do not click on Module Exit or Test Exit.
• You cannot change your answer of any previous question.

Test Basic Requirements:
o A Personal Computer / Laptop.
o Smooth and uninterrupted Internet connectivity (throughout the testing session).
o Webcam connected with the System.

Browser/OS Requirements:
This Assessment is supported by the below listed Browsers/ Versions only.
o Google Chrome (version 50.0 and above).
o Mozilla Firefox (version 50.0 and above).
o In case you are taking the test on Windows 8, make sure you disable all the popups/ notifications.

Please ensure that you complete the test within 4 hours of logging in. You can attempt the test at any time before the 'end time'.

Your Cognizant candidate ID:

An Eight Digit Number (Cognizant ID) would have been shared by your placement officer / Cognizant Team. Please refer the same and enter the correct Candidate ID during the test process.

Following are the steps for taking the test:

• For taking the AMCAT exam, click on the URL provided in the email and follow the instructions.
• At several instances during the test, you will be prompted to allow the access of your webcam. Please grant the test software access to your webcam.
• Once your webcam has been tested, enter the username and password provided to you in this mail.
• Select the check box, "I have read & agree to the terms and conditions and wish to continue the test".
• Click on Start New Test and fill the registration form.
• Click on Start Test. A 14-digit number will appear, this is your AMCAT ID. Kindly save it for your future reference.
• To answer a question, click on Confirm and then Next to submit your answer.

Disclaimer:
• *Cognizant does not entertain payments of any kind from candidates or vendors for employment. Requests for such payments should be promptly reported to TAGCompliance@Cognizant.com*
• *Please report any phishing attempt to the following email id: CSIRT@Cognizant.com.*
• *To ascertain that you are receiving an official call from Cognizant, please ensure you collect the recruiter's details (full name; employee ID; and mobile number) during the call.*

D. Detailed Syllabus

Quantitative Aptitude
- Numbers
- Profit and Loss, Partnerships and Averages
- Time and Work
- Permutation, Combination and Probability
- Percentages, SI and CI
- Ratios and Proportions
- Algebraic Expressions
- Surds, Indices and Simplification
- Time Speed & Distance
- Functions

Logical Reasoning
- Coding and Decoding
- Series, Analogy, Odd Man Out and Visual Reasoning
- Data Arrangements
- Blood Relations
- Attention to detail
- Clocks, Calendars
- Cubes and Direction Sense
- Data Interpretation
- Data Sufficiency

Debugging
- Code Re-use
- Compilation/ Syntactical Error
- Logical Error

In C/ C++/ Java

Coding (For GenC Next)
- Fundamentals of Programming (Arrays, Strings, Functions, Pointers, Operators)
- Data Structures (Linked List, Stack, Queue, Trees, Tries, Graphs)
- Algorithmic Techniques (The following is the list of the most important Algorithmic techniques, while the list of Algorithms is huge. Learning these will help you be prepared to tackle most problems as well as learn new Algorithms).
    - o Dynamic Programming
    - o Backtracking
    - o Branching and Bounding
    - o Bitwise
    - o Greedy

Writing Ability
There isn't a syllabus per se for the Writing Ability section. Having said that, this section is expected to test the following parameters, like most writing ability rounds do.
- Grammar
- Vocabulary
- Spellings
- Relevance of content to the topic
- Adherence to the word limit

Some tips for this section are:
- Write simple and short sentences
- Do not use complex words. They do not earn you brownie points.
- Stick to the topic.
- Plan your write-up mentally before going and typing into the writing area.

E. Previous Year Questions and Answers

E1. Quantitative Aptitude

Q1. Ronald and Elan are working on an assignment. Ronald takes 6 hours to type 32 pages on a computer, while Elan takes 5 hours to type 40 pages on a computer. How much time will they take, working together on two different computers to type an assignment of 110 pages?

A. 7 hours 30 minutes
B. 8 hours
C. 8 hours 15 minutes
D. 8 hours 25 minutes

Explanation:
Ronald takes 6 hours to type 32 pages and Elan takes 5 hours to type 40 pages. To find their efficiencies, we need to find the number of pages they type in 1 hour.

Ronald: 6 hours → 32 pages
1 hour → 32/6 pages
Elan: 5 hours → 40 pages
1 hour → 50/4 → 8 pages

Working together → Ronald + Elan → (32/6 + 8) pages/hour
In one hour, they complete 80/6 pages

Number of hours to complete 110 pages = (110*6)/80 = 8.25 hours (which is 8 hours 15 minutes).
Option C is the answer.

Q2. What is the number of 6-digit numbers that can be formed from 0, 1, 5, 6, 7 and 8 in which the first digit is not 0 (No repetition allowed)?

A. 120 B. 600 C. 720 D. 800

Explanation:
Let's put the number of possibilities of filling each digit. The first place cannot take zero, so any one of the remaining 5 numbers can occupy the first digit. Hence the number of possibilities will be 5.

5 _ _ _ _ _

The remaining digits don't have any restrictions, so remaining 5 numbers can be arranged in 5! ways

$5P_5$ or 5!

5 _ _ _ _ _

It can be written as

5 * 5 * 4 * 3 * 2 * 1

Thus, the answer is 600. Option B.

Q3. What are the values for X and Y in 72X23Y for it to be perfectly divisible by 88?
A. X=1 & Y=5 B. X=7 & Y=5
C. X=3 & Y=2 D. X=7 & Y=2

Explanation:
72X23Y should be divisible by 88
88 can be written as 8*11

In order to make a number divisible by 88, we should make it divisible by 8 and 11

Divisibility rule of 8:
Last three digits of a number should be divisible by 8
As per the given question, 23Y should be divisible by 8.
8*28 = 224, 8*29 = 232, 8*30 = 240.
Only if we substitute 2 in place of Y, it will be divisible by 8.
Y = 2

Divisible rule of 11:
The difference between sum of alternate numbers should be zero or a number divisible by 11

(7+X+3) - (2+2+2) = 0 or 11

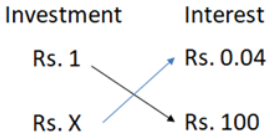
(10+X) - 6 = 11(it is not possible to get zero as a difference as 10+X will exceed 6)

17 - 6 = 11(Only if we substitute 7 for X, it will be possible to get this answer)

Thus, the answer is X=7 & Y=2. Option D.

Q4. An investment earns 4 paisa per rupee invested. If, at the end of the year, the interest earned by the investment is Rs.100, then the investment is equal to ____.
A. Rs. 4000 B. Rs. 2000 C. Rs. 2200 D. Rs. 2500

Explanation:
Converting 4 paise to rupee = Rs. 0.04
If investment is Rs. 1, interest is Rs.0.04
If investment is Rs. X, interest is Rs. 100



X = 100/0.04 = 2500. Option D
Alternative method:
If we earn Rs. 0.04 for a rupee, interest percentage would be 0.04/1 *100 = 4%
To get Rs. 100 as interest, P value should be
Interest = PNR/100
100 = (P*1*4)/100
P = Rs. 2500. Option D

Q5. Coins of 1, 2 and 5 rupees are tossed. What is the probability of getting heads on a 1-rupee coin, tails on a 2-rupee coin and heads on a 5-rupee coin?
A. 1/2 B. 1/4 C. 1/8 D. 1/16

Explanation:
P(Getting heads on a 1 rupee coin) = 1/2
P(Getting tails on a 2 rupee coin) = 1/2
P(Getting heads on a 5 rupee coin) = 1/2

The probability of all the events happening simultaneously = 1/2 * 1/2 * 1/2 = 1/8 *(Option C)*

Q6. A man bought 400 meters of clothes at the rate of 40,000 rupees, and sold it at 200 rupees per one and a half meters. What was his percentage profit or loss?
A. 36% profit B. 25% loss
C. 33.33% profit D. 27% loss

Explanation:
400 metres → Rs. 40000
1 metre → Rs. 40000/400 = Rs. 100
0.5 metre → Rs. 50
Cost price of 1.5 metres = 100+50 = Rs. 150

The selling price has been given as Rs. 200 for the same 1.5 metres.

So, the man would get the profit of Rs. 50(for every 1.5 metres)

Profit percentage = P/CP * 100 = 50/150 * 100 = 33.33% profit
Option C

Q7. If the difference of the two numbers is 8 and the difference of their squares is 160, then the numbers are _____.
A. 18, 10 B. 8, 16
C. 6, 14 D. None of the above

Explanation:
Assume X and Y are the two numbers mentioned in the question.
X-Y = 8 → Eq 1
$X^2 - Y^2 = 160$
We know that, $a^2-b^2 = (a+b)(a-b)$
$X^2-Y^2 = (X+Y)(X-Y)$
160 = (X+Y) * 8
(X+Y) = 20 → Eq 2
Solving Eq 1 and 2, we will get X = 14 and Y = 6 (*Option C*)

Q8. The total number of prime factors of $(3x5)^{12}\ (2x7)^{10}\ (10)^{25}$ is _____.
A. 47 B. 60
C. 72 D. None of the above

Explanation:
The question is to find the number of prime factors and not the total number of factors of a number.
$(3x5)^{12}\ (2x7)^{10}\ (10)^{25}$
$= (3x5)^{12}\ (2x7)^{10}\ (5x2)2^{25}$
$= 3^{12} \times 5^{12} \times 2^{10} \times 7^{10} \times 5^{25} \times 2^{25}$
$= 2^{35} \times 3^{12} \times 5^{37} \times 7^{10}$

Total number of prime factors = 35+12+37+10 = 94
94 is not given in the options. Hence the answer is *Option D.*

Q9. What is the remainder if 825 is divided by 7?
A. 25 B. 8 C. 1 D. 0

Explanation:

$\frac{8^1}{7}$ ⇒ R(1)

$\frac{8^2}{7}$ ⇒ R(1)

$\frac{8^3}{7}$ ⇒ R(1)

8 raised to the power any number divided by 7 provides us 1 as the remainder. So, 825 / 7 will also provide 1 as the remainder. Hence the answer is *Option C.*

Q10. If the sum of the two numbers is 27 and their HCF and LCM is 3 and 60 respectively, then what is the sum of the reciprocal of the two numbers?
A. 1/10 B. 1/5 C. 3/10 D. 3/20

Explanation:
Let's assume the two numbers to be X and Y.
X+Y = 27
HCF(X,Y) = 3
LCM(X,Y) = 60

We know that, HCF * LCM = Product of two numbers
3 * 60 = X * Y
XY = 180
1/X + 1/Y = (X+Y)/XY
= 27/180 = 9/60 = 3/20 *(Option D)*

Alternative method:
XY = 180 → X =180/Y
180/Y + Y = 27
Y2 - 27Y + 180 = 0
Y = 12 or 15
If Y = 12, X will be X = 27-12= 15
If Y = 15, X will be 12
The sum of reciprocal of these numbers will be 1/12 + 1/15
= 9/60 = 3/20. *(Option D)*

Q11. Train A takes 16 hours to reach Mumbai from Delhi, while train B takes 20 hours. The name of train A is Sabarmati Express, while train B is named as the Peepinsta Express. What is the ratio of the speeds of the both the trains (A, B)?
A. 1:4 B. 4:5 C. 5:4 D. 3:2

Explanation:
Time taken by A and B are in the ratio of 16:20 = 4:5
As we know already, time is inversely proportional to speed.
If time ratio is 4:5, then speed ratio will be 5:4. (*Option C)*

Q12. If $nC_5=nC_6$, then what is the value of $15C_n$ = ?
A. 1365 B. 15! C. 11 D. 11!

Explanation:
The given expression $nC_5=nC_6$ is in the form of $nC_r = nC_{n-r}$
Comparing both, r = 5, n-r = 6
If we substitute r = 5, then n will be
n-5 = 6 → n = 11
We have been asked to find $15C_n = 15C_{11}$
15C11 can also be written as $15C_{15-11} = 15C_4$
= (15*14*13*12)/(1*2*3*4) = 1365 (*Option A*)

Q13. Rahul purchased 7 DVDs, each of which costs Rs.17. He gave a 500 Rs. note to the shopkeeper. The amount returned to him is divisible by _____.
A. 3 B. 7 C. 9 D. 11

Explanation:
Each DVD costs Rs. 17. 7 DVDs will cost = 7*17 = 119 and he provides a 500 rupee note. The change amount would be Rs. 381

By applying the divisibility rule of 3 (Addition of digits is 12 and it is divisible by 3), the answer is 3. (*Option A*)

Q14. Pratik, Satyam and Abhishek are eligible to be the captain of the cricket team. Shahid, Ajay, Shishir and Aanand are eligible to be the co-captain of cricket team. How many possible outcomes are there for selecting a captain and a co-captain?
A. 12 B. 7 C. 9 D. 16

Explanation:
3 members are eligible to captain the cricket team and we have to choose one captain = $3C_1$
4 members are eligible to co-captain the cricket team and we have to choose one co-captain = $4C_1$
Possible ways of choosing a captain and a co-captain = 3*4 = 12 (*Option A*)

Q15. The length and breadth of a rectangle are directly proportional to each other. If the length increases from 6 cm to 21 cm and now the breadth is 14 cm, then what was the breadth before any changes in the length occurred?
A. 4 cm B. 15 cm C. 2 cm D. 3 cm

Explanation:
The length and breadth are proportional.
The length changed from 6 cm to 21 cm = 6:21 = 2:7
Since both are proportional, the answer should be in the ratio of 2:7.
Let's assume the initial breadth value to be X and the current breadth is given as 14 cm.
X:14 should be equal to 2:7 → X/14 = 2/7 → X = 4 cm (*Option A*)

Q16. The simple interest earned on a certain amount is double the money when invested for 15 years. What is the interest rate offered?
A. 26.66% B. 12% C. 30% D. 13.33%

Explanation:
If S.I = 2 times the amount invested = 2P
S.I = PNR/100
2P = P*15*R/100
R = 200/15 = 13.33% (*Option D*)

Alternative method:
Amount(A) = Principle(P) + Interest(I)
A = P + I
If interest becomes 2 times the amount invested(principle), then total amount will be P+2P = 3P
3P = P + PNR/100
3P = P(1 + 15*R/100)
R = 13.33% (*Option D*)

Q17. A bank advertises that you can double the money by investing it with them for 8 years. What is the interest rate offered by them?
A. 12.50% B. 10% C. 8.50% D. 14%

Explanation:
The invested money doubles itself in 8 years
Amount(A) = Principle(P) + Interest(I)
A = P + I
For amount to double after 8 years, the interest value should become equal to amount invested.
A = P + P = 2P
2P = P + PNR/100
2P = P(1 + 8R/100)
100/8 = 12.50% (*Option A*)

Q18. A started a business at Rs. 2,70,000 and B joined him 3 months afterwards. How much money did B invest, if the profit share of A at the end of the year is three-fifth of the total profit?
A. Rs. 2,80,000 B. Rs. 1,00,000
C. Rs. 2,40,000 D. Rs. 2,70,000

Explanation:
As we know, Investment is directly proportional to the profit, which means that the profit should be divided based on the investment ratio(profit ratio = investment ratio)

A's profit → 3/5
So, B's profit → 2/5
Profit ratio of A:B = 3:2
Investment ratio of A:B is also equal to 3:2

A invested 2,70,000 for 12 months and it is equal to 3 parts of the investment.
3 parts = 2,70,000*12
1 part = 10,80,000

B has invested 2 parts → Assume X rupees and it is for 9 months (since B joined late)
2 parts = X*9 = 2*10,80,000
X = (2*1080000)/9 = Rs. 2,40,000 (*Option C*)

Q19. (X^n-27) is divisible by (X-3), when n is equals to _____.
A. 1 B. 2 C. 3 D. 4

Explanation:
(X^n - 27) is divisible by (X-3)
Since X-3 divides (X^n - 27) without leaving a remainder, it must be a factor of (X^n - 27)

Let's equate it to zero
X-3 = 0
X = 3
3^n - 27 = 0
Only 3^3 = 27.
So, n = 3. (*Option C*)

Q20. What sum of money will accumulate to Rs. 5300 at 8% of simple interest for 9 months?
A. Rs. 5,000 B.Rs. 5,400 C. Rs. 4,500 D. Rs. 4,000

Explanation:
Amount(A) = Principle(P) + Interest(I)
A = P + PNR/100
5300 = P(1+ ((9/12)*8)/100))
P = Rs. 5000 (*Option A*)

E2. Logical Reasoning

Q1. If COMPUTER is coded as GKQLYPIN, what is the code for SENATE?
A. WAREXA B. WAERXA
C. WARWXA D. WAERAX

Explanation:
COMPUTER is coded as GKQLYPIN
C+4 = G; O-4 = K; M+4 = Q; P-4 = L; U+4 = Y; T-4 = P
E+4 = I; R-4 = N

Following the same pattern for the question "SENATE", we will get S+4 = W; E-4 = A; N+4 = R; A-4 = W; T+4 = X; E-4 = A

The answer should be WARWXA. (*Option C*)

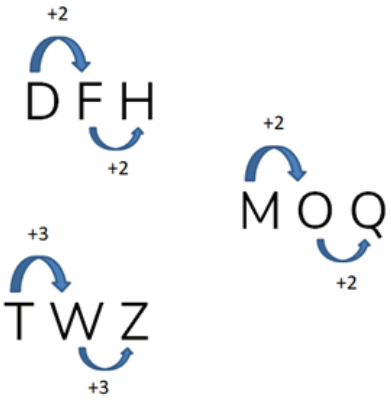
Q2. Pick the odd man out.
A. KML B. PRQ C. NPQ D. TVU

Explanation:
The pattern given in three of the options is

The only option which doesn't follow this pattern is *Option C.*

Q3. Pick the odd man out.
A. AEK B. DFH C. TWZ D. MOQ

Explanation:

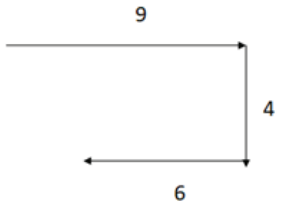


In three of the given options, the difference between consecutive letters of the word is the same.

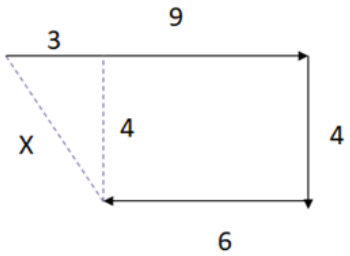
But this condition is not satisfied in the *Option A.*
AEK → A-E = 4 & E-K = 6

Q4. Suneeta moves a distance of 9 meters towards East. She then moves towards South and travels a distance of 4 meters. From here, she moves a distance of 6 meters towards West. How far is the starting point from her final position?
A. 3 meters B. 4 meters C. 5 meters D. 7 meters

Explanation:
Using the instructions given in the question,



In order to find the distance between the initial and final position, we can form a right-angled triangle



$X^2 = 3^2 + 4^2$
X = 5 (*Option C*)

Q5. Pointing towards a person in a photograph. Pinki said, "He is the cousin of my mother's husband". How is that person related to Pinki?
A. Father B. Uncle
C. Brother D. Brother-in-Law

Explanation:
The key statement is "He is the cousin of my mother's husband".

My mother's husband → My Father
Cousin of my Father → My uncle
Thus, our answer is *Option B.*

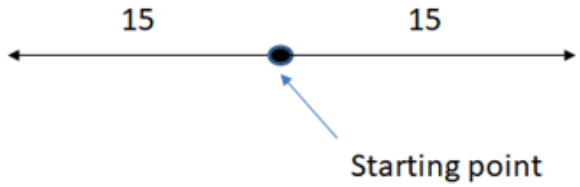
Q6. If SPORTS is coded as TOPQUR, then GAME is coded as _____.
A. HZND B. FBNF C. HBND D. FZNF

Explanation:
SPORTS is coded as TOPQUR
S+1 = T; P-1 = O; O+1 = P; R-1 = Q; T+1 = U; S-1 = R

GAME → G+1, A-1, M+1 and E-1 = HZND
Answer is *Option A.*

Q7. Faizal is standing at point A facing North, he walks 15 meters to his left and takes an about-turn and walks 30 meters. How far and in which direction he is from the starting point?
A. 15 meters, West B. 15 meters, East
C. 45 meters, East D. 45 meters, West

Explanation:



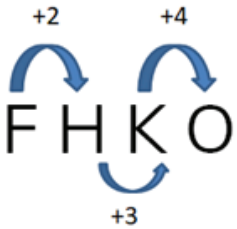
He will be 15 meters and facing East from the starting point. *(Option B)*

Q8. Find the next number in the series 24, 50, 102, ?
A. 204 B. 206 C. 152 D. 156

Explanation:
24*2 + 2 = 50
50*2 + 2 = 102
Next term should be
102*2 +2 = 206 *(Option B)*

Q9. Pick the odd man out.
A. FHKO B. CEHL C. ZBEJ D. XZCG

Explanation:
The pattern given in three of the options is as follows.



The only option which doesn't follow this pattern is *Option C*.

Q10. Find the alphabetical order which can replace '?' in the given analogy. AZP : ZAR :: TXK : ?
A. UWL B. SYM
C. SVN D. VWL

Explanation:
As per the given pattern,
A-1 = Z; Z+1 = A; P+2 = R
So, our answer must be
T-1 = S; X+1 = Y; K+2 = M *(Option B)*

Q11. Find the next term in the given series 9 , 54 , 135 , 252 , ?
A. 400 B. 405 C. 380 D. 420

Explanation:
All the given numbers are multiples of 9. The only option which is a multiple of 9 is *Option B*.

Q12. If DEED is coded as 4554, then DICE is coded as _____.
A. 4935 B. 4839 C. 3824 D. 3935

Explanation:
DEED is coded as 4554. In this code, the position numbers of all the letters have been given. i.e. D is the 4th letter in the English alphabet, E is the 5th letter and so on.
Therefore, DICE = 4935. (*Option A*)

Q13. Find the alphabetical order which can replace '?' in the given analogy G3S : J3P :: L4X : ?
A. P3Y B. O3T C. P4T D. Q4S

Explanation:
G3S : J3P
G+3 = J; S-3 = P

L+4 & X-4 should give us the answer
L+4 = P; X-4 = T

The answer should be P4T. (*Option C*)

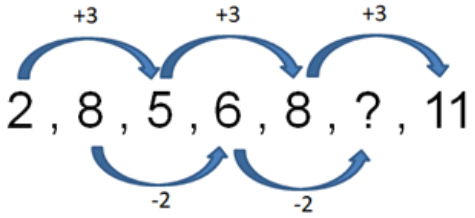
Q14. If EAGLE is coded as FZHKF, what is the code for THANKS?
A. UGBMLR B. RCZMJT
C. UIBOLT D. RIAOJT

Explanation:
EAGLE is coded as FZHKF
E+1 = F; A-1 = Z; G+1 = H; L-1 = K; E+1 = F

Following a similar pattern → THANKS will be coded as UGBMLR
Option A

Q15. Find the missing term 2 , 8 , 5 , 6 , 8 , ? , 11
A. 5 B. 10 C. 4 D. 2

Explanation:



6 - 2 = 4 (*Option C*)

Q16. For the question that follows, please choose A/ B/ C/ D depending on how statements i and ii help in answering it.

Problem Question: What is the monthly salary of my father?

Statements:
i) My father's and mother's salaries are in the ratio of 5:2 respectively.
ii) My mother's salary is 40% of my father's salary.

To answer the question, which of the following options best suits, by taking into account the given statements?
A. Statement i alone is sufficient
B. Statement ii alone is sufficient
C. Both the statements put together are sufficient
D. Both the statements put together are insufficient

Explanation:
Statement i:
Without knowing the sum of the salaries, it is not possible to find the father's salary using the given ratio.
Statement ii:
Since the salary of the mother is not provided, we cannot find the 40% of it to get the father's salary.

Combining both will also not help us find the answer as the salary of mother or sum of salaries is not provided in either of the statements. (*Option D*)

Q17. Please choose the appropriate option by going through the following statements and conclusions. The meaning of symbols used in the statements is given below.

"%" denotes "greater than",
">" denotes "equal to",
"=" denotes "not less than",
"@" denotes "not equal to",
"#" denotes "less than",
"*" denotes "not greater than"

Statements: A%B , C=E , D*B

Conclusions:
i) A#D
ii) C*E

Which of the following can be inferred?
A. Only conclusion i is true
B. Only conclusion ii is true
C. Either conclusion i or ii is true
D. Neither conclusion i nor ii is true

Explanation:
As per the given statements
A%B → A is greater than B
C=E → C is greater than or equal to E
D*B → D is less than or equal to B

Conclusion i
A#D → A<D
We know A is greater than B, which is greater than D. So, A cannot be lesser than D. This conclusion is not true
Conclusion ii
C*E → C<=E
As per the given statement, C is greater than or equal to E but this conclusion is contrast to the actual statement.

Both the conclusions are not following the given statements. (*Option D*)

Q18. Decode the word(s) / pattern given in the question.
If MATH can be coded as RFYM, what is the code for PHYSICS in that language?

A. UMDXNHX B. UMDVNHV
C. UMDVNHY D. UMDXHNX

Explanation:
MATH → RFYM
M+5 = R; A+5 = F; T+5 = Y; H+5 = M

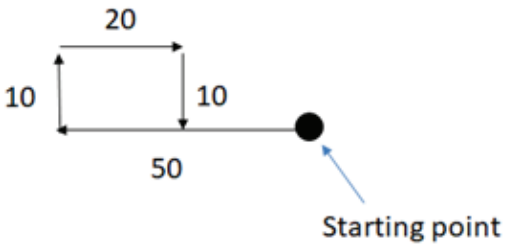
PHYSICS
P+5 = U; H+5 = M; Y+5 = D; S+5 = X
I+5 = N; C+5 = H; S+5 = X

PHYSICS → UMDXNHX
Option A

Q19. Choose the correct option.
Deepak walks 50 meters towards West, then turns right and walks 10 meters, then turns right again to walk 20 meters. At last, he turns right and walks 10 meters. How far and in which direction is he from the starting point?

A. 30 meters, East
B. 20 meters, West
C. 30 meters, West
D. 20 meters, East

Explanation:



He is facing 30 meters, West from the starting point. (*Option C*)

Q20. The question consists of a problem question followed by two statements I and II. Find out if the information given in the statement(s) is sufficient in finding the solution to the problem.

Problem Question: When is Mohit's birthday?

Statements:
(I) He was born after 19th but before 25th September.
(II) He was born in a leap year.

A. Statement I alone is sufficient
B. Statement II alone is sufficient
C. Both statements put together are sufficient
D. Both the statements even put together are not sufficient

Explanation:
With the help of the first statement, we cannot conclude the exact date of Mohit's birthday.
With the second statement alone, we cannot find the answer as the year or month is not provided.

By combining both, we can understand his birthday falls on a leap year and it is between 19th and 25th September but the exact date cannot be found. Thus, the answer is *Option D*.

E3. Debugging

Q1. Given n, print from n to 0
Debug the given code.

Sample Input: 4
Output: 4 3 2 1 0

Question in C

```c
#include <stdio.h>
int main() {
  int n;

    cin>>n;

    unsigned int i = n;

    while(i >= 0)
    {
      cout<<i;
        i--;
    }
   return 0;
}
```

Solution in C

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int i = n;
    while(i >= 0)
    {
      printf("%d ",i);
        i--;
    }
   return 0;
}
```

Question in C++

```cpp
#include<bits/stdc++.h>
using namespace std;

int main() {
  int n;

    cin>>n;

    unsigned int i = n;

    while(i >= 0)
    {
      cout<<i;
        i--;
    }
   return 0;
}
```

Solution in C++

```cpp
#include<bits/stdc++.h>
using namespace std;

int main() {
    int n;
    cin>>n;
    int i = n;
    while(i >= 0)
    {
      cout<<i<<" ";
        i--;
    }
   return 0;
}
```

Question in Java

```java
import java.util.*;

class main {
  public static void main (String[] args) {
    Scanner sc =new Scanner(System.in);
    int n;
    n=sc.nextInt();
    unsigned int i=n;
    while(i >= 0)
        {
      cout<<i;
        i--;
        }
  }
}
```

Solution in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc =new Scanner(System.in);
    int n;
    n=sc.nextInt();
    int i=n;
    while(i >= 0)
        {
      System.out.print(i+" ");
        i--;
        }
  }
}
```

Q2. Find the factorial of a given number.
Debug the given code.

Sample Input:
20
Sample Output:
2432902008176640000

Question in C

```c
#include <stdio.h>
int main()
{
int fact = 1, n, i;
scanf("%ld",&n);

for(i =1; i <= n; i++)
{
     fact = fact * i;
}

printf("%ld",fact);
return 0;
}
```

Solution in C

```c
#include<stdio.h>
int main()
{
long int fact = 1, n, i;
scanf("%ld",&n);

for(i =1; i <= n; i++)
{
     fact = fact * i;
}

printf("%ld",fact);
return 0;
}
```

Question in C++

```cpp
#include<bits/stdc++.h>
using namespace std;

int main()
{
int fact = 1, n, i;
cin>>n;

for(i =1; i <= n; i++)
{
      fact = fact * i;
}

cout<<fact;
return 0;
}
```

Solution in C++

```cpp
#include<bits/stdc++.h>
using namespace std;
int main()
{
long int fact = 1, n, i;
cin>>n;
for(i =1; i <= n; i++)
{
      fact = fact * i;
}
cout<<fact;
return 0;
}
```

Question in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int fact = 1, n, i;
    n=sc.nextLong();
    for(i =1; i <= n; i++)
        {
            fact = fact * i;
        }
    System.out.print(fact);
  }
}
```

Solution in Java

```java
import java.util.*;
class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    long fact = 1, n, i;
    n=sc.nextLong();
    for(i =1; i <= n; i++)
        {
            fact = fact * i;
        }
    System.out.print(fact);
  }
}
```

Q3. Write a program to print the following output.

A part of the code has already been given in the question. Please complete it to make the program work.

Sample Input:
5

Expected Output:

```
11111
1   1
1   1
1   1
11111
```

Question in C

```c
#include <stdio.h>

int pattern(int n)
{
  //Your code goes here
}
int main()
{
    int n;
    scanf("%d",&n);
    pattern(n);
}
```

Solution in C

```c
#include <stdio.h>

int pattern(int n)
{
    int i,j;
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=n;j++)
        {
            if(i==1||i==n||j==1||j==n)
                printf("1");
            else
                printf(" ");
        }
        printf("\n");
    }
}
int main()
{
    int n;
    scanf("%d",&n);
    pattern(n);
}
```

Question in C++

```cpp
#include <iostream>
using namespace std;
int pattern(int n)
{
  //Your code goes here
}
int main()
{
    int n;
    cin>>n;
    pattern(n);
}
```

Solution in C++

```cpp
#include <iostream>
using namespace std;

int pattern(int n)
{
    int i,j;
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=n;j++)
        {
            if(i==1||i==n||j==1||j==n)
                cout<<"1";
            else
                cout<<" ";
        }
        cout<<endl;
    }
}
int main()
{
    int n;
    cin>>n;
    pattern(n);
}
```

Question in Java

```java
import java.util.*;

class Main {

    static void pattern(int n){

        //Your code goes here

    }
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int n=sc.nextInt();
    pattern(n);
  }
}
```

Solution in Java

```java
import java.util.*;

class Main {

    static void pattern(int n){
        int i,j;
        for(i=1;i<=n;i++)
        {
            for(j=1;j<=n;j++)
            {
                if(i==1||i==n||j==1||j==n)
                    System.out.print("1");
                else
                    System.out.print(" ");
            }
            System.out.println();
    }

    }
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int n=sc.nextInt();
    pattern(n);
  }
}
```

Q4. Write a program to print the binary value of given Decimal number. A part of the code has already been given in the question. Please complete it to make the program work.
Sample Input: 5
Expected Output: 101

Question in C

```c
#include<stdio.h>
int dec_to_bin(int n)
{
   //Your code goes here
}
int main()
{
    int n;
    scanf("%d",&n);
    printf("%d",dec_to_bin(n));
}
```

Solution in C

```c
#include<stdio.h>
int dec_to_bin(int n)
{
    int rem,rev=0,power=1;
    while(n!=0)
    {
        rem=n%2;
        rev=rev+rem*power;
        n/=2;
        power=power*10;
    }
    return rev;
}
int main()
{
    int n;
    scanf("%d",&n);
    printf("%d",dec_to_bin(n));
}
```

Question in C++

```cpp
#include <iostream>
using namespace std;

int dec_to_bin(int n)
{
    //Your code goes here
}
int main()
{
    int n;
    cin>>n;
    cout<<dec_to_bin(n);
}
```

Solution in C++

```cpp
#include <iostream>
using namespace std;

int dec_to_bin(int n)
{
    int rem,rev=0,power=1;
    while(n!=0)
    {
        rem=n%2;
        rev=rev+rem*power;
        n/=2;
        power=power*10;
    }
    return rev;
}
int main()
{
    int n;
    cin>>n;
    cout<<dec_to_bin(n);
}
```

Question in Java

```java
import java.util.*;

class Main {

    static int dec_to_bin(int n){

    //Your code goes here
      return 0;
    }
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int n=sc.nextInt();
    System.out.println(dec_to_bin(n));
  }
}
```

Solution in Java

```java
import java.util.*;
class Main {

    static int dec_to_bin(int n){
        int rem,rev=0,power=1;
        while(n!=0)
        {
            rem=n%2;
            rev=rev+rem*power;
            n/=2;
            power=power*10;
        }
        return rev;

    }
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int n=sc.nextInt();
    System.out.println(dec_to_bin(n));
  }
}
```

Q5. Fix the error in the code given below.

Question in C

```c
#include <stdio.h>
int main() {
  int num1, num2, num3;
  scanf("%d %d %d",&num1,&num2,&num3);
  if(num1 > num2) && (num1 > num3)
  {
  printf("%d",num1);
  }
  elseif(num2>num3)
  {
  printf("%d",num2);;
  }
  else
  {
  printf("%d",num3);
  }
  return 0;
}
```

Solution in C

```c
#include <stdio.h>
int main() {
  int num1, num2, num3;
  scanf("%d %d %d",&num1,&num2,&num3);
  if((num1 > num2) && (num1 > num3))
  {
  printf("%d",num1);
  }
  else if(num2>num3)
  {
  printf("%d",num2);;
  }
  else
  {
  printf("%d",num3);
  }
  return 0;
}
```

Question in C++

```cpp
#include<bits/stdc++.h>
using namespace std;

int main() {
  int num1, num2, num3;
  cin>>num1>>num2>>num3;
  if(num1 > num2) && (num1 > num3)
  {
  cout<<num1;
  }
  elseif(num2>num3)
  {
  cout<<num2;
  }
  else
  {
  cout<<num3;
  }
  return 0;
}
```

Solution in C++

```cpp
#include<bits/stdc++.h>
using namespace std;

int main() {
  int num1, num2, num3;
  cin>>num1>>num2>>num3;
  if((num1 > num2) && (num1 > num3))
  {
  cout<<num1;
  }
  else if(num2>num3)
  {
  cout<<num2;
  }
  else
  {
  cout<<num3;
  }
  return 0;
}
```

Question in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int num1,num2,num3;
    num1=sc.nextInt();
    num2=sc.nextInt();
    num3=sc.nextInt();
    if(num1 > num2) && (num1 > num3)
        {
          System.out.println(num1);
        }
        elseif(num2>num3)
        {
          System.out.println(num2);
        }
        else
        {
          System.out.println(num3);
        }
  }
}
```

Solution in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int num1,num2,num3;
    num1=sc.nextInt();
    num2=sc.nextInt();
    num3=sc.nextInt();
    if((num1 > num2) && (num1 > num3))
        {
          System.out.println(num1);
        }
        else if(num2>num3)
        {
          System.out.println(num2);
        }
        else
        {
          System.out.println(num3);
        }
  }
}
```

Q6. Find the syntax error in the code given below.

Question in C

```c
#include<stdio.h>
int main(){
    int x = 1;
  switch (x)
  {
  case 2: printf("Choice is 1") break;
  case 1: printf("Choice is 2"); break;
  }
    return 0;
}
```

Solution in C

```c
#include<stdio.h>
int main(){
  int x = 1;
  switch (x)
  {
  case 2: printf("Choice is 1"); break;
  case 1: printf("Choice is 2"); break;
  }
  return 0;
}
```

Question in C++

```cpp
#include <iostream>
using namespace std;
int main(){

  int x = 1;
  switch (x)
  {
  case 2: printf("Choice is 1") break;
  case 1: printf("Choice is 2"); break;
  }
    return 0;
}
```

Solution in C++

```cpp
#include <iostream>
using namespace std;
int main(){
  int x = 1;
  switch (x)
  {
  case 2: printf("Choice is 1"); break;
  case 1: printf("Choice is 2"); break;
  }
  return 0;
}
```

Question in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    int x = 1;
        switch (x)
        {
          case 2: System.out.println("Choice is 1") break;
          case 1: System.out.println("Choice is 2"); break;
  }
  }
}
```

Solution in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    int x = 1;
        switch (x)
        {
          case 2: System.out.println("Choice is 1"); break;
          case 1: System.out.println("Choice is 2"); break;
  }
  }
}
```

Q7. Write a program to find odd or even for the given integer input.
The given program compiles successfully but fails to return the desired result for some test cases due to logical errors.
Your task is to fix the code so that it passes all the test cases.

Question in C

```c
#include<stdio.h>
int main()
{
  int a;
  scanf("%d",&a);
  if((a&&1)==1)
  {
    printf("Odd\n");
  }
  else
  {
    printf("Even\n");
  }
}
```

Solution in C

```c
#include<stdio.h>
int main()
{
  int a;
  scanf("%d",&a);
  if((a&1)==1)
  {
    printf("Odd\n");
  }
  else
  {
    printf("Even\n");
  }
}
```

Question in C++

```cpp
#include <iostream>
using namespace std;

int main()
{
  int a;
  cin>>a;
  if((a&&1)==1)
  {
    cout<<"Odd"<<endl;
  }
  else
  {
    cout<<"Even"<<endl;
  }
}
```

Solution in C++

```cpp
#include <iostream>
using namespace std;

int main()
{
  int a;
  cin>>a;
  if((a&1)==1)
  {
    cout<<"Odd"<<endl;
  }
  else
  {
    cout<<"Even"<<endl;
  }
}
```

Question in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int a;
    a=sc.nextInt();
    if((a&&1)==1)
      {
          System.out.println("Odd");
      }
      else
      {
          System.out.println("Even");
      }
  }
}
```

Solution in Java

```java
import java.util.*;

class Main {
  public static void main (String[] args) {
    Scanner sc=new Scanner(System.in);
    int a;
    a=sc.nextInt();
    if((a&1)==1)
      {
          System.out.println("Odd");
      }
      else
      {
          System.out.println("Even");
      }
  }
}
```

E4. Coding

The Coding section is new to Cognizant. What you see below are Automata Questions tested by other popular recruiters who use AMCAT as their assessment platform. Questions invariably tend to repeat or similar questions tend to appear between recruiters who use the AMCAT platform. Other companies which use the AMCAT platform are Wipro, DXC Technologies, Deloitte, NTT Data etc.

Q1. Mr. Jason has captured your friend and has put a collar around his neck. He has locked it with a given 'locking key'. It can be opened now with an 'unlocking key'. Your friend has seen the 'locking key' but he does not know about the 'unlocking key'. Given the locking key, one can figure out the 'Unlocking key' which is the smallest (in magnitude) permutation of the digits of that number. Help your friend to write an algorithm that takes the locking key as an input and outputs the unlocking key.

Input Format : The input consists of an integer K, representing the locking key.
Output Format : Print an integer representing the unlocking key
Sample Input : 11
Sample Output : 1 1

Solution in C++

```
#include<iostream>
using namespace std;
int main()  {
        int a,b[15],i=0,t,k,s,h,n=0;
        cin>>a;
        while(a!=0)  {
                b[i++]=a%10;
                a/=10;
                n++;
        }
        for(s=0;s<n;s++) {
                for(h=s+1;h<n;h++) {
                        if(b[s]>b[h])  {
                                t=b[s];
                                b[s]=b[h];
                                b[h]=t;
                        }
                }
        }
        for(i=0;i<n;i++)
        cout<<b[i]<<" ";
        return 0;
}
```

Q2. Write a program to print the right-angled triangle pattern using * symbol.
Input Format : Input consist of 1 integer
Output Format : Refer sample output
Sample Input : 5
Sample Output:

```
*
* *
* * *
* * * *
* * * * *
```

Solution in C++

```cpp
#include <iostream>
using namespace std;
int main()
{
  int n, c, k;
  cin>>n;

  for (c = 1; c <= n; c++)
  {
    for(k = 1; k <= c; k++)
      cout<<"* ";

    cout<<"\n";
  }

  return 0;
}
```

Q3. Write the program to reverse each word of a string.
Input Format : Input consist of one string
Output Format : Reverse each of the words of the string
Sample Input : Hello World
Sample Output : World Hello

Solution in C++

```cpp
#include <iostream>
#include <stdio.h>
#include <string.h>
using namespace std;

int main()
{
    string str;
    int i, j, len, startIndex, endIndex;

    getline(cin,str);

    len = str.size();
    endIndex = len - 1;

    for(i = len - 1; i >= 0; i--)
  {
    if(str[i] == ' ' || i == 0)
    {
      if(i == 0)
      {
        startIndex = 0;
      }
      else
      {
        startIndex = i + 1;
      }
      for(j = startIndex; j <= endIndex; j++)
      {
        cout<<str[j];
      }
      endIndex = i - 1;
      cout<<" ";
    }
  }

    return 0;
}
```

Q4. Given head to the singly linear linked list, traversal M nodes and delete N node repeatedly until you reach the end.
Hint: Traverse the list M nodes and delete N nodes,
Connect the Mth node and N+1th node directly.
Consider the edge case that the list terminates.

Sample Input:
10
3 2
1 2 3 4 5 6 7 8 9 1

Sample Output:
1 2 3 6 7 8

Solution in C++

```cpp
#include<bits/stdc++.h>
using namespace std;
struct S_Node
{
    int data;
    S_Node *next;
};
void MTraverseNDelete(struct S_Node  *head, int M, int N)
{
    int count = 0;
    S_Node *cur=head,*prev=head,*rem;
    while(cur != NULL)
    {
        for(int i=0;i<M;i++)
        {
            if(cur == NULL)
                break;
            prev=cur;
            cur=cur->next;
        }
        if(cur == NULL)
            break;
        for(int i=0;i<N;i++)
        {
            if(cur == NULL)
                break;
            rem=cur;
            cur=cur->next;
            free(rem);
        }
            prev->next=cur;
    }
}
struct S_Node *start = NULL;
void Traversal(struct S_Node *S_Node)
{
    while (S_Node != NULL)
    {
        cout<<S_Node->data<<" ";
        S_Node = S_Node->next;
    }
  cout<<endl;

}
void CreateList(int n1)
{
    int n,value;
    n=n1;
    struct S_Node *temp;
    for(int i=0;i<n;i++)
    {
        cin>>value;
        if(i==0)
        {
            start=(struct S_Node *) malloc( sizeof(struct S_Node) );
            start->data=value;
            start->next=NULL;
            temp=start;
            continue;
        }
        else
        {
            temp->next= (struct S_Node *) malloc( sizeof(struct S_Node) );
            temp=temp->next;
            temp->data=value;
            temp->next=NULL;
        }
    }
}
int main()
{
    int n1;
  cin>>n1;
    int m,n;
    cin>>m;
    cin>>n;
  CreateList(n1);
    MTraverseNDelete(start,m,n);
  Traversal(start);
    return 0;
}
```

Q5. Write a program to find the common ancestor of given two numbers in a tree. Let T be a rooted tree. The lowest common ancestor between two nodes n1 and n2 is defined as the lowest node in T that has both n1 and n2 as descendants (where we allow a node to be descendant of itself). The LCA of n1 and n2 in T is the shared ancestor of n1 and n2 that is located farthest from the root. Computation of Lowest common ancestor is useful, for instance, as part of a procedure for determining the distance between pairs of nodes in a tree: the distance from n1 to n2 can be computed as the distance from the root to n1, plus the distance from the root to n2, minus twice the distance from the root to their lowest common ancestor.

Sample Input:
6
3
1
4
2
-1
3 6

Sample Output:
6

Solution in C++

```
#include<bits/stdc++.h>
using namespace std;
struct node
{
        int data;
        struct node *left,*right;
};
struct node *root;
struct node* create(int n)
{
  struct node *temp = (struct node*)malloc(sizeof(struct node *));
  temp->data=n;
  temp->right=temp->left=NULL;
}
struct node* lca(struct node *root, int n1, int n2)
{
  if(root->data>n1 && root->data>n2)
    return lca(root->left,n1,n2);
  else if(root->data<n1 && root->data<n2)
      return lca(root->right,n1,n2);
    return root;
}
void insert(struct node *temp,struct node *t)
{
  if(t->data<temp->data && t->right!=NULL)
    insert(temp,t->right);
  if(t->data<temp->data && t->right==NULL)
    t->right=temp;
  if(t->data>temp->data && t->left!=NULL)
    insert(temp,t->left);
  if(t->data>temp->data && t->left==NULL)
    t->left=temp;
}
int main()
{
  int n;
  cin>>n;
  while(n!=-1)
  {
    struct node *newnode = create(n);
    if(root==NULL)
      root=newnode;
    else
      insert(newnode,root);
    cin>>n;
  }
  int n1,n2;
  cin>>n1>>n2;
  struct node *temp = lca(root,n1,n2);
  cout<<temp->data;
}
```