**Question 1 –**

#include <stdio.h>

int main() {

    int num, originalNum, remainder, result = 0, n = 0;

    printf("Enter a number: ");

    scanf("%d", &num);

    originalNum = num;

    while (originalNum != 0) {

        originalNum /= 10;

        n++;

    }

    originalNum = num;

    while (originalNum != 0) {

        remainder = originalNum % 10;

        int power = 1;

        for (int i = 0; i < n; i++) {

            power \*= remainder;

        }

        result += power;

        originalNum /= 10;

    }

    if (result == num) {

        printf("%d is an Armstrong number.\n", num);

    } else {

        printf("%d is not an Armstrong number.\n", num);

    }

    return 0;

}

**Question 2 –**

**#include <stdio.h>**

**int findHCF(int a, int b) {**

**while (b != 0) {**

**int temp = b;**

**b = a % b;**

**a = temp;**

**}**

**return a;**

**}**

**int main() {**

**int num1, num2, hcf;**

**printf("Enter two integers: ");**

**scanf("%d %d", &num1, &num2);**

**hcf = findHCF(num1, num2);**

**printf("HCF of %d and %d is: %d\n", num1, num2, hcf);**

**return 0;**

**}**

**Question 6-**

#include <stdio.h>

void determineQuadrant(int x, int y) {

    if (x > 0 && y > 0) {

        printf("The coordinate point (%d,%d) lies in the First quadrant.\n", x, y);

    } else if (x < 0 && y > 0) {

        printf("The coordinate point (%d,%d) lies in the Second quadrant.\n", x, y);

    } else if (x < 0 && y < 0) {

        printf("The coordinate point (%d,%d) lies in the Third quadrant.\n", x, y);

    } else if (x > 0 && y < 0) {

        printf("The coordinate point (%d,%d) lies in the Fourth quadrant.\n", x, y);

    } else if (x == 0 && y != 0) {

        printf("The coordinate point (%d,%d) lies on the Y-axis.\n", x, y);

    } else if (y == 0 && x != 0) {

        printf("The coordinate point (%d,%d) lies on the X-axis.\n", x, y);

    } else {

        printf("The coordinate point (%d,%d) is at the Origin.\n", x, y);

    }

}

int main() {

    int x, y;

    printf("Enter the coordinates (x y): ");

    scanf("%d %d", &x, &y);

    determineQuadrant(x, y);

    return 0;

}

**Question 8-**

**#include <stdio.h>**

**int main() {**

**int n;**

**printf("Enter the number of rows: ");**

**scanf("%d", &n);**

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

**for (int j = 1; j <= i; j++) {**

**if ((i + j) % 2 == 0) {**

**printf("1");**

**} else {**

**printf("0");**

**}**

**}**

**printf("\n");**

**}**

**return 0;**

**}**

**Question 9 –**

**#include <stdio.h>**

**int main() {**

**int n;**

**printf("Enter the number of rows: ");**

**scanf("%d", &n);**

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

**for (int j = 1; j <= i; j++) {**

**if ((i + j) % 2 == 0) {**

**printf("0");**

**} else {**

**printf("1");**

**}**

**}**

**printf(" ");**

**for (int j = 1; j <= i; j++) {**

**if ((i + j) % 2 == 0) {**

**printf("0");**

**} else {**

**printf("1");**

**}**

**}**

**printf("\n");**

**}**

**return 0;**

**}**

**Question 11 –**

**#include <stdio.h>**

**void increaseMarks(int marks[], int size) {**

**for (int i = 0; i < size; i++) {**

**marks[i] += 5;**

**}**

**}**

**void printMarks(int marks[], int size) {**

**printf("Updated Marks:\n");**

**for (int i = 0; i < size; i++) {**

**printf("Student %d: %d\n", i + 1, marks[i]);**

**}**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**increaseMarks(marks, n);**

**printMarks(marks, n);**

**return 0;**

**}**

**Question 12 –**

**#include <stdio.h>**

**void printGrades(int marks[], int size) {**

**printf("Grades of Students:\n");**

**for (int i = 0; i < size; i++) {**

**printf("Student %d: ", i + 1);**

**if (marks[i] >= 75) {**

**printf("A Grade\n");**

**} else if (marks[i] >= 60) {**

**printf("B Grade\n");**

**} else if (marks[i] >= 40) {**

**printf("C Grade\n");**

**} else {**

**printf("D Grade\n");**

**}**

**}**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**printGrades(marks, n);**

**return 0;**

**}**

**Question 13-**

**#include <stdio.h>**

**int findFirst99(int marks[], int size) {**

**for (int i = 0; i < size; i++) {**

**if (marks[i] == 99) {**

**return i + 1;**

**}**

**}**

**return -1;**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**int position = findFirst99(marks, n);**

**if (position != -1) {**

**printf("The first student who scored 99 is Student %d.\n", position);**

**} else {**

**printf("No student scored 99.\n");**

**}**

**return 0;**

**}**

**Question 14-**

**#include <stdio.h>**

**void findAll99(int marks[], int size) {**

**int count = 0;**

**printf("Students who scored 99:\n");**

**for (int i = 0; i < size; i++) {**

**if (marks[i] == 99) {**

**printf("Student %d\n", i + 1);**

**count++;**

**}**

**}**

**if (count == 0) {**

**printf("No student scored 99.\n");**

**} else {**

**printf("Total number of students who scored 99: %d\n", count);**

**}**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**findAll99(marks, n);**

**return 0;**

**}**

**Question 15-**

**#include <stdio.h>**

**int calculateSum(int marks[], int size) {**

**int sum = 0;**

**for (int i = 0; i < size; i++) {**

**sum += marks[i];**

**}**

**return sum;**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**int totalSum = calculateSum(marks, n);**

**printf("The sum of all scores is: %d\n", totalSum);**

**return 0;**

**}**

**Question 16-**

**#include <stdio.h>**

**float calculateAverage(int marks[], int size) {**

**int sum = 0;**

**for (int i = 0; i < size; i++) {**

**sum += marks[i];**

**}**

**return (float)sum / size;**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**float average = calculateAverage(marks, n);**

**printf("The average score is: %.2f\n", average);**

**return 0;**

**}**

**Question 17-**

**#include <stdio.h>**

**void checkEvenOdd(int marks[], int size) {**

**printf("Even/Odd status of scores:\n");**

**for (int i = 0; i < size; i++) {**

**if (marks[i] % 2 == 0) {**

**printf("Student %d: %d is Even\n", i + 1, marks[i]);**

**} else {**

**printf("Student %d: %d is Odd\n", i + 1, marks[i]);**

**}**

**}**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**checkEvenOdd(marks, n);**

**return 0;**

**}**

**Question 18-**

**#include <stdio.h>**

**void findMaxMin(int marks[], int size, int \*max, int \*min) {**

**\*max = marks[0];**

**\*min = marks[0];**

**for (int i = 1; i < size; i++) {**

**if (marks[i] > \*max) {**

**\*max = marks[i];**

**}**

**if (marks[i] < \*min) {**

**\*min = marks[i];**

**}**

**}**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**int max, min;**

**findMaxMin(marks, n, &max, &min);**

**printf("Maximum score: %d\n", max);**

**printf("Minimum score: %d\n", min);**

**return 0;**

**}**

**Question 19-**

**#include <stdio.h>**

**int findPeakElement(int marks[], int size) {**

**if (size == 1 || marks[0] >= marks[1])**

**return 0;**

**if (marks[size - 1] >= marks[size - 2])**

**return size - 1;**

**for (int i = 1; i < size - 1; i++) {**

**if (marks[i] >= marks[i - 1] && marks[i] >= marks[i + 1]) {**

**return i;**

**}**

**}**

**return -1;**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**int peakIndex = findPeakElement(marks, n);**

**if (peakIndex != -1) {**

**printf("Peak element found at Student %d with score: %d\n", peakIndex + 1, marks[peakIndex]);**

**} else {**

**printf("No peak element found.\n");**

**}**

**return 0;**

**}**

**Question 20-**

**#include <stdio.h>**

**#include <stdbool.h>**

**bool isPrime(int num) {**

**if (num < 2) {**

**return false;**

**}**

**for (int i = 2; i \* i <= num; i++) {**

**if (num % i == 0) {**

**return false;**

**}**

**}**

**return true;**

**}**

**int countPrimes(int marks[], int size) {**

**int primeCount = 0;**

**for (int i = 0; i < size; i++) {**

**if (isPrime(marks[i])) {**

**primeCount++;**

**}**

**}**

**return primeCount;**

**}**

**int main() {**

**int n;**

**printf("Enter the number of students: ");**

**scanf("%d", &n);**

**int marks[n];**

**printf("Enter the marks of %d students:\n", n);**

**for (int i = 0; i < n; i++) {**

**printf("Student %d: ", i + 1);**

**scanf("%d", &marks[i]);**

**}**

**int primeCount = countPrimes(marks, n);**

**printf("The number of prime numbers in the array: %d\n", primeCount);**

**return 0;**

**}**

**Question 21-**

**#include <stdio.h>**

**void printArray(int arr[], int size) {**

**for (int i = 0; i < size; i++) {**

**printf("%d ", arr[i]);**

**}**

**printf("\n");**

**}**

**void insertAtFront(int arr[], int \*size, int value) {**

**for (int i = \*size; i > 0; i--) {**

**arr[i] = arr[i - 1];**

**}**

**arr[0] = value;**

**(\*size)++;**

**}**

**void insertAtPosition(int arr[], int \*size, int value, int position) {**

**if (position < 0 || position > \*size) {**

**printf("Invalid position!\n");**

**return;**

**}**

**for (int i = \*size; i > position; i--) {**

**arr[i] = arr[i - 1];**

**}**

**arr[position] = value;**

**(\*size)++;**

**}**

**void insertAtEnd(int arr[], int \*size, int value) {**

**arr[\*size] = value;**

**(\*size)++;**

**}**

**int main() {**

**int n, choice, value, position;**

**printf("Enter the initial number of elements in the array: ");**

**scanf("%d", &n);**

**int arr[n + 1];**

**printf("Enter the elements of the array:\n");**

**for (int i = 0; i < n; i++) {**

**printf("Element %d: ", i + 1);**

**scanf("%d", &arr[i]);**

**}**

**printf("Initial array: ");**

**printArray(arr, n);**

**printf("Choose insertion type:\n");**

**printf("1. Insert at front\n");**

**printf("2. Insert at any position\n");**

**printf("3. Insert at end\n");**

**printf("Enter your choice: ");**

**scanf("%d", &choice);**

**switch (choice) {**

**case 1:**

**printf("Enter the value to insert at front: ");**

**scanf("%d", &value);**

**insertAtFront(arr, &n, value);**

**break;**

**case 2:**

**printf("Enter the value to insert: ");**

**scanf("%d", &value);**

**printf("Enter the position to insert (0 to %d): ", n);**

**scanf("%d", &position);**

**insertAtPosition(arr, &n, value, position);**

**break;**

**case 3:**

**printf("Enter the value to insert at end: ");**

**scanf("%d", &value);**

**insertAtEnd(arr, &n, value);**

**break;**

**default:**

**printf("Invalid choice!\n");**

**return 1;**

**}**

**printf("Updated array: ");**

**printArray(arr, n);**

**return 0;**

**}**

**Question 22-**

**#include <stdio.h>**

**void printArray(int arr[], int size) {**

**for (int i = 0; i < size; i++) {**

**printf("%d ", arr[i]);**

**}**

**printf("\n");**

**}**

**void deleteAtFront(int arr[], int \*size) {**

**for (int i = 0; i < \*size - 1; i++) {**

**arr[i] = arr[i + 1];**

**}**

**(\*size)--;**

**}**

**void deleteAtPosition(int arr[], int \*size, int position) {**

**if (position < 0 || position >= \*size) {**

**printf("Invalid position!\n");**

**return;**

**}**

**for (int i = position; i < \*size - 1; i++) {**

**arr[i] = arr[i + 1];**

**}**

**(\*size)--;**

**}**

**void deleteAtEnd(int arr[], int \*size) {**

**(\*size)--;**

**}**

**int main() {**

**int n, choice, position;**

**printf("Enter the initial number of elements in the array: ");**

**scanf("%d", &n);**

**int arr[n];**

**printf("Enter the elements of the array:\n");**

**for (int i = 0; i < n; i++) {**

**printf("Element %d: ", i + 1);**

**scanf("%d", &arr[i]);**

**}**

**printf("Initial array: ");**

**printArray(arr, n);**

**printf("Choose deletion type:\n");**

**printf("1. Delete at front\n");**

**printf("2. Delete at any position\n");**

**printf("3. Delete at end\n");**

**printf("Enter your choice: ");**

**scanf("%d", &choice);**

**switch (choice) {**

**case 1:**

**deleteAtFront(arr, &n);**

**break;**

**case 2:**

**printf("Enter the position to delete (0 to %d): ", n - 1);**

**scanf("%d", &position);**

**deleteAtPosition(arr, &n, position);**

**break;**

**case 3:**

**deleteAtEnd(arr, &n);**

**break;**

**default:**

**printf("Invalid choice!\n");**

**return 1;**

**}**

**printf("Updated array: ");**

**printArray(arr, n);**

**return 0;**

**}**

**Question 23-**

**#include <stdio.h>**

**void rotateArray(int arr[], int size) {**

**if (size <= 1) {**

**return;**

**}**

**int lastElement = arr[size - 1];**

**for (int i = size - 1; i > 0; i--) {**

**arr[i] = arr[i - 1];**

**}**

**arr[0] = lastElement;**

**}**

**void printArray(int arr[], int size) {**

**for (int i = 0; i < size; i++) {**

**printf("%d ", arr[i]);**

**}**

**printf("\n");**

**}**

**int main() {**

**int n;**

**printf("Enter the number of elements in the array: ");**

**scanf("%d", &n);**

**int arr[n];**

**printf("Enter the elements of the array:\n");**

**for (int i = 0; i < n; i++) {**

**printf("Element %d: ", i + 1);**

**scanf("%d", &arr[i]);**

**}**

**printf("Initial array: ");**

**printArray(arr, n);**

**rotateArray(arr, n);**

**printf("Array after rotation: ");**

**printArray(arr, n);**

**return 0;**

**}**

**Question 24-**

**#include <stdio.h>**

**void printDuplicates(int arr[], int size) {**

**int foundDuplicate = 0;**

**int visited[size];**

**for (int i = 0; i < size; i++) {**

**visited[i] = 0;**

**}**

**for (int i = 0; i < size; i++) {**

**if (visited[i] == 1) {**

**continue;**

**}**

**for (int j = i + 1; j < size; j++) {**

**if (arr[i] == arr[j]) {**

**visited[j] = 1;**

**foundDuplicate = 1;**

**}**

**}**

**if (foundDuplicate) {**

**printf("%d ", arr[i]);**

**foundDuplicate = 0;**

**}**

**}**

**if (!foundDuplicate) {**

**printf("-1");**

**}**

**printf("\n");**

**}**

**int main() {**

**int n;**

**printf("Enter the number of elements in the array: ");**

**scanf("%d", &n);**

**int arr[n];**

**printf("Enter the elements of the array:\n");**

**for (int i = 0; i < n; i++) {**

**printf("Element %d: ", i + 1);**

**scanf("%d", &arr[i]);**

**}**

**printf("Duplicates in the array: ");**

**printDuplicates(arr, n);**

**return 0;**

**}**

**Question 25-**

**#include <stdio.h>**

**#include <math.h>**

**void displayMenu() {**

**printf("Simple Calculator Menu:\n");**

**printf("1. Addition\n");**

**printf("2. Subtraction\n");**

**printf("3. Multiplication\n");**

**printf("4. Division\n");**

**printf("5. Logarithmic values\n");**

**printf("6. Square roots\n");**

**printf("7. Exit\n");**

**}**

**int main() {**

**int choice;**

**double num1, num2, result;**

**while (1) {**

**displayMenu();**

**printf("Enter your choice (1-7): ");**

**scanf("%d", &choice);**

**switch (choice) {**

**case 1:**

**printf("Enter two numbers: ");**

**scanf("%lf %lf", &num1, &num2);**

**result = num1 + num2;**

**printf("Result: %.2lf\n", result);**

**break;**

**case 2:**

**printf("Enter two numbers: ");**

**scanf("%lf %lf", &num1, &num2);**

**result = num1 - num2;**

**printf("Result: %.2lf\n", result);**

**break;**

**case 3:**

**printf("Enter two numbers: ");**

**scanf("%lf %lf", &num1, &num2);**

**result = num1 \* num2;**

**printf("Result: %.2lf\n", result);**

**break;**

**case 4:**

**printf("Enter two numbers: ");**

**scanf("%lf %lf", &num1, &num2);**

**if (num2 != 0) {**

**result = num1 / num2;**

**printf("Result: %.2lf\n", result);**

**} else {**

**printf("Error: Division by zero is not allowed.\n");**

**}**

**break;**

**case 5:**

**printf("Enter a number: ");**

**scanf("%lf", &num1);**

**if (num1 > 0) {**

**result = log(num1);**

**printf("Logarithm (base e) of %.2lf: %.2lf\n", num1, result);**

**} else {**

**printf("Error: Logarithm is only defined for positive numbers.\n");**

**}**

**break;**

**case 6:**

**printf("Enter a number: ");**

**scanf("%lf", &num1);**

**if (num1 >= 0) {**

**result = sqrt(num1);**

**printf("Square root of %.2lf: %.2lf\n", num1, result);**

**} else {**

**printf("Error: Square root is not defined for negative numbers.\n");**

**}**

**break;**

**case 7:**

**printf("Exiting the calculator. Goodbye!\n");**

**return 0;**

**default:**

**printf("Invalid choice. Please choose a valid option (1-7).\n");**

**}**

**}**

**return 0;**

**}**

**Question 26-**

**#include <stdio.h>**

**#include <stdlib.h>**

**#include <time.h>**

**int main() {**

**int userChoice, computerChoice;**

**srand(time(0));**

**printf("Rock, Paper, Scissors Game!\n");**

**printf("Enter your choice:\n");**

**printf("0 - Rock\n");**

**printf("1 - Paper\n");**

**printf("2 - Scissors\n");**

**printf("Your choice (0/1/2): ");**

**scanf("%d", &userChoice);**

**if (userChoice < 0 || userChoice > 2) {**

**printf("Invalid choice! Please enter 0, 1, or 2.\n");**

**return 1;**

**}**

**int randomNum = rand() % 100;**

**if (randomNum < 34) {**

**computerChoice = 0;**

**} else if (randomNum < 67) {**

**computerChoice = 1;**

**} else {**

**computerChoice = 2;**

**}**

**printf("Your choice: %s\n", userChoice == 0 ? "Rock" : (userChoice == 1 ? "Paper" : "Scissors"));**

**printf("Computer's choice: %s\n", computerChoice == 0 ? "Rock" : (computerChoice == 1 ? "Paper" : "Scissors"));**

**if (userChoice == computerChoice) {**

**printf("It's a tie!\n");**

**} else if ((userChoice == 0 && computerChoice == 2) ||**

**(userChoice == 1 && computerChoice == 0) ||**

**(userChoice == 2 && computerChoice == 1)) {**

**printf("You win!\n");**

**} else {**

**printf("Computer wins!\n");**

**}**

**return 0;**

**}**

**Question 27-**

**#include <stdio.h>**

**#include <string.h>**

**#define MAX\_TRIES 3**

**void displayWord(char word[], char guessed[]) {**

**int length = strlen(word);**

**for (int i = 0; i < length; i++) {**

**if (guessed[i]) {**

**printf("%c ", word[i]);**

**} else {**

**printf("\_ ");**

**}**

**}**

**printf("\n");**

**}**

**int main() {**

**char word[] = "hangman";**

**int length = strlen(word);**

**char guessed[length];**

**int tries = 0;**

**int correctGuesses = 0;**

**char guess;**

**memset(guessed, 0, sizeof(guessed));**

**printf("Welcome to Hangman Game!\n");**

**printf("Guess the word: \n");**

**while (tries < MAX\_TRIES) {**

**displayWord(word, guessed);**

**printf("Enter a letter: ");**

**scanf(" %c", &guess);**

**int found = 0;**

**for (int i = 0; i < length; i++) {**

**if (word[i] == guess && !guessed[i]) {**

**guessed[i] = 1;**

**correctGuesses++;**

**found = 1;**

**}**

**}**

**if (found) {**

**printf("Good guess!\n");**

**} else {**

**tries++;**

**printf("Wrong guess! You have %d tries left.\n", MAX\_TRIES - tries);**

**}**

**if (correctGuesses == length) {**

**printf("Congratulations! You've guessed the word: %s\n", word);**

**return 0;**

**}**

**}**

**printf("Sorry, you've been hanged! The word was: %s\n", word);**

**return 0;**

**}**