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Practical 05 – CS102.3

Section A

Question 1 – while loop

```
#include <stdio.h>

int main() {

    int i = 0;

    while (i <= 100) {

        printf("%d\n", i);

        i++;

    }

    return 0;

}
```

Question 1 – do while loop

```
#include <stdio.h>

int main() {

    int i = 0;

    do {

        printf("%d\n", i);

        i++;

    } while (i <= 100);

    return 0;

}
```

Question 1 – for loop

```
#include <stdio.h>

int main() {
```

```c
    int i;

    for (i = 0; i <= 100; i++) {

        printf("%d\n", i);

    }

    return 0;

}
```

Question 2

```c
#include <stdio.h>

int main() {

    int marks[10];

    int i = 0, total = 0;

    float average;

    printf("Enter 10 marks:\n");

    while (i < 10) {

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

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

        total += marks[i];

        i++;

    }

    average = (float)total / 10.0;

    printf("Total: %d\n", total);

    printf("Average: %.2f\n", average);

    if (average < 50.0) {

        printf("Fail!\n");

    } else {

        printf("Pass!\n");
```

```c
    }
    return 0;
}
```

Question 3

```c
#include <stdio.h>

int main() {
    int number;
    int factorial = 1;
    printf("Enter a number: ");
    scanf("%d", &number);
    if (number < 0) {
        printf("Factorial is not defined for negative numbers.\n");
    } else {
        for (int i = 1; i <= number; i++) {
            factorial *= i;
        }
        printf("Factorial of %d is: %d\n", number, factorial);
    }
    return 0;
}
```

Question 4

```c
#include <stdio.h>

int main() {
    int number, originalNumber, digit, sum = 0;
    printf("Enter a number: ");
```

```c
        scanf("%d", &number);

        originalNumber = number;

        while (number != 0) {

            digit = number % 10;

            sum += digit;

            number /= 10;

        }

        printf("Sum of digits of %d is: %d\n", originalNumber, sum);

        return 0;

}
```

Question 5

```c
#include <stdio.h>

int main() {

    int number, reversedNumber = 0, remainder;

    printf("Enter a number: ");

    scanf("%d", &number);

    do {

        remainder = number % 10;

        reversedNumber = reversedNumber * 10 + remainder;

        number /= 10;

    } while (number != 0);

    printf("Reversed number: %d\n", reversedNumber);

    return 0;

}
```

Question 6

```c
#include <stdio.h>
int main() {
    int base, exponent;
    int result = 1;
    printf("Enter the base: ");
    scanf("%d", &base);
    printf("Enter the exponent: ");
    scanf("%d", &exponent);
    for (int i = 0; i < exponent; i++) {
        result *= base;
    }
    printf("%d raised to the power of %d is: %d\n", base, exponent, result);
    return 0;
}
```

Question 7

```c
#include <stdio.h>
int main() {
    int num1 = 0, num2 = 1, next, count;
    printf("First 10 numbers of the Fibonacci sequence:\n");
    printf("%d\n%d\n", num1, num2);
    for (count = 3; count <= 10; count++) {
        next = num1 + num2;
        printf("%d\n", next);
        num1 = num2;
        num2 = next;
```

```c
    }
    return 0;
}
```

Question 8

```c
#include <stdio.h>
int power(int base, int exponent) {
    int result = 1;
    while (exponent != 0) {
        result *= base;
        --exponent;
    }
    return result;
}
int countDigits(int number) {
    int count = 0;
    while (number != 0) {
        number /= 10;
        ++count;
    }
    return count;
}
int isArmstrong(int number) {
    int originalNumber = number;
    int digits = countDigits(number);
    int result = 0;
```

```c
        while (originalNumber != 0) {

            int remainder = originalNumber % 10;

            result += power(remainder, digits);

            originalNumber /= 10;

        }

        if (result == number)

            return 1;

        else

            return 0;

}

int main() {

    int number;

    printf("Enter a number: ");

    scanf("%d", &number);

    if (isArmstrong(number))

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

    else

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

    return 0;

}
```

Question 9

```c
#include <stdio.h>

int main() {

    char letter;

    printf("ASCII values for letters A to Z:\n");

    for (letter = 'A'; letter <= 'Z'; letter++) {
```

```c
        printf("%c: %d\n", letter, letter);

    }

    return 0;

}
```

Question 10

```c
#include <stdio.h>

int main() {

    printf("*\n");

    printf("**\n");

    printf("***\n");

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

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

    return 0;

}
```

Question 11

```c
#include <stdio.h>

int isPrime(int num) {

  if (num <= 1) {

    return 0;

  }

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

    if (num % i == 0) {

      return 0;

    }

  }
```

```c
        return 1;
}
int main() {
    int number;
    printf("Enter a number: ");
    scanf("%d", &number);
    if (isPrime(number)) {
        printf("%d is a prime number.\n", number);
    } else {
        printf("%d is not a prime number.\n", number);
    }
    return 0;
}
```

Question 12

```c
#include <stdio.h>
void printFactors(int number) {
    printf("Factors of %d: ", number);
    for (int i = 1; i <= number; i++) {
        if (number % i == 0) {
            printf("%d ", i);
        }
    }
    printf("\n");
}
int main() {
    int number;
```

```c
    printf("Enter an integer: ");

    scanf("%d", &number);

    printFactors(number);

    return 0;

}
```

Question 13

```c
#include <stdio.h>

int main() {

    int size = 10;

    int array[size];

    printf("Enter %d integers:\n", size);

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

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

    }

    printf("The entered array is: ");

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

        printf("%d ", array[i]);

    }

    printf("\n");

    return 0;

}
```

Question 14

```c
#include <stdio.h>

int main() {

    int size = 10;
```

```c
    int array[size];

    printf("Enter %d integers:\n", size);

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

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

    }

    int evenc = 0;

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

        if (array[i] % 2 == 0) {

            evenc++;

        }

    }

    printf("The count of even numbers in the array is: %d\n", evenc);

    return 0;

}
```

Section B

Question 1

```c
#include <stdio.h>

int main() {

    int size = 10;

    int numbers[size];

    int positiveCount = 0;

    int negativeCount = 0;

    int zeroCount = 0;

    printf("Enter %d numbers:\n", size);

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

        scanf("%d", &numbers[i]);
```

```c
        if (numbers[i] > 0) {

            positiveCount++;

        } else if (numbers[i] < 0) {

            negativeCount++;

        } else {

            zeroCount++;

        }

    }

    printf("Number of positive numbers: %d\n", positiveCount);

    printf("Number of negative numbers: %d\n", negativeCount);

    printf("Number of zeros: %d\n", zeroCount);

    return 0;

}
```

Question 2

```c
#include <stdio.h>

int main() {

    int size = 10;

    int marks[size];

    int sum = 0;

    int maximum = 0;

    int minimum = 100;

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

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

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

        sum += marks[i];

        if (marks[i] > maximum) {
```

```c
            maximum = marks[i];

      }

      if (marks[i] < minimum) {

            minimum = marks[i];

      }

   }

   float average = (float)sum / size;

   printf("Maximum marks: %d\n", maximum);

   printf("Minimum marks: %d\n", minimum);

   printf("Average marks: %.2f\n", average);

   return 0;

}
```

Question 3

```c
#include <stdio.h>

int main() {

   int size = 10;

   float prices[size];

   float sum = 0;

   int countGreater = 0;

   printf("Enter the prices of %d items:\n", size);

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

      scanf("%f", &prices[i]);

      sum += prices[i];

      if (prices[i] > 200) {

            countGreater++;

      }
```

```c
    }
    float average = sum / size;
    printf("Average value of an item: %.2f\n", average);
    printf("Number of items with price greater than 200: %d\n", countGreater);
    return 0;
}
```

Question 4

```c
#include <stdio.h>
int main() {
    int employeeNo;
    float basicSalary;
    int count = 0;
    printf("Enter employee number and basic salary (-999 to end):\n");
    while (1) {
        scanf("%d", &employeeNo);
        if (employeeNo == -999) {
            break;
        }
        scanf("%f", &basicSalary);
        if (basicSalary >= 5000) {
            count++;
        }
    }
    printf("Number of employees with basic salary >= 5000: %d\n", count);
    return 0;
}
```

Question 5

```c
#include <stdio.h>

int main() {

    int empNo;

    int hoursWorked;

    int otRate = 150;

    int otRateExcess = 200;

    int otPayment;

    int countExceeding = 0;

    int countTotal = 0;

    printf("Enter employee number and hours worked (-999 to end):\n");

    while (1) {

        scanf("%d", &empNo);

        if (empNo == -999) {

            break;

        }

        scanf("%d", &hoursWorked);

        if (hoursWorked <= 40) {

            otPayment = otRate * hoursWorked;

        } else {

            otPayment = otRate * 40 + otRateExcess * (hoursWorked - 40);

        }

        printf("Emp No: %d\n", empNo);

        printf("OT Payment: Rs. %d\n", otPayment);

        if (otPayment > 4000) {

            countExceeding++;

        }
```

```c
        countTotal++;

    }

    float percentageExceeding = (float)countExceeding / countTotal * 100;

    printf("Percentage of employees with OT payment exceeding Rs. 4000: %.2f%%\n",
percentageExceeding);

    return 0;

}
```