ASSIGNMENT - LOOP

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COURSE CODE : CSE 103

Course Title: Structured Programming Language

SECTION :11

Q1. Write a program (WAP) that will print following series upto Nth terms.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,…..

Answer:

```
#include <stdio.h>
int main() {
int n, i;
printf("Enter the number of terms: ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
printf("%d ", i);
}
return 0;
}
```

Output:

```
Enter the number of terms: 20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Process returned 0 (0x0)   execution time : 4.533 s
Press any key to continue.
```

Q2. Write a program (WAP) that will print following series upto Nth terms.

1,3,5,7,9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31

Answer:

```
#include <stdio.h>
int main() {
int n, i;
printf("Enter the number of terms: ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
printf("%d ", 2*i-1);
}

return 0;
}
```

Output:

```
Enter the number of terms: 30
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59
Process returned 0 (0x0)   execution time : 3.910 s
Press any key to continue.
```

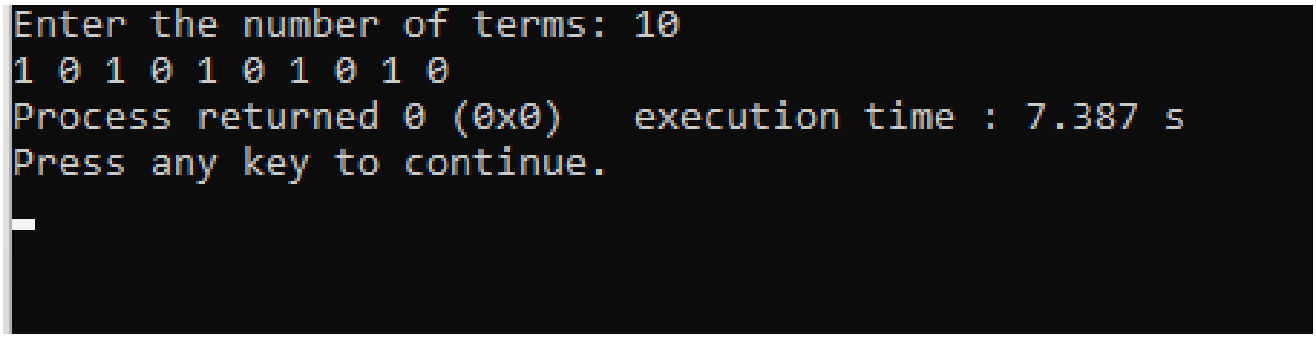
Q3. Write a program (WAP) that will print following series upto Nth terms.

1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1,

Answer:

```
#include <stdio.h>

int main() {
int n, i;
printf("Enter the number of terms: ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
if (i % 2 == 1) {
printf("1 ");
} else {
printf("0 ");
}
}

return 0;
}
```

Output:



Q4. Write a program (WAP) that will take N numbers as inputs and compute their average.
(Restriction: Without using any array)

Answer:

```
#include <stdio.h>
int main() {
int n, i, num;
float sum = 0, avg;
printf("Enter the number of elements: ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
printf("Enter element %d: ", i);
scanf("%d", &num);
sum += num;
}
avg = sum / n;
printf("The average is %.2f\n", avg);

return 0;
}
```

Output:

```
Enter the number of elements: 3
Enter element 1: 10
Enter element 2: 20
Enter element 3: 30.5
The average is 20.00
```

Q5. Write a program (WAP) that will take two numbers X and Y as inputs. Then it will print the square of X and increment (if X<Y) or decrement (if X>Y) X by 1, until X reaches Y. If and when X is equal to Y, the program prints "Reached!"

Answer:

```
#include <stdio.h>
int main() {
int x, y, i;
printf("Enter two numbers: ");
scanf("%d %d", &x, &y);

while (x != y) {
printf("The square of %d is %d\n", x, x*x);
if (x < y) {
x++;
} else {
x--;
}
}
printf("Reached!\n");
return 0;
}
```

Output:

```
Enter two numbers: 10
5
The square of 10 is 100
The square of 9 is 81
The square of 8 is 64
The square of 7 is 49
The square of 6 is 36
Reached!
```

Q6. Write a program (WAP) for the described scenario: Player-1 picks a number X and Player-2 has to guess that number within N tries. For each wrong guess by Player-2, the program prints "Wrong, N-1 Choice(s) Left!" if Player-2 at any time successfully guesses the number, the program prints "Right, Player-2 wins!" and terminates right away. Otherwise after the completion of N wrong tries, the program prints "Player-1 wins!" and halts

Answer:

```
#include <stdio.h>
int main() {
int x, guess, n, i;
printf("Player-1, enter a number: ");
scanf("%d", &x);
printf("Player-2, you have to guess the number in how many tries? ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
printf("Guess the number (try %d): ", i);
scanf("%d", &guess);

if (guess == x) {
printf("Right, Player-2 wins!\n");
break;
} else {
printf("Wrong, %d Choice(s) Left!\n", n - i);
if (i == n) {
printf("Player-1 wins!\n");
}
}
}
return 0;
}
```

Output:

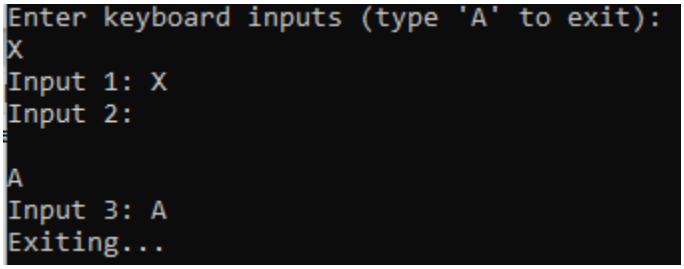
```
Player-1, enter a number: 5
Player-2, you have to guess the number in how many tries? 4
Guess the number (try 1): 12
Wrong, 3 Choice(s) Left!
Guess the number (try 2): 8
Wrong, 2 Choice(s) Left!
Guess the number (try 3): 5
Right, Player-2 wins!
```

Q7. Write a program (WAP) that will run and show keyboard inputs until the user types an "A" at the keyboard.

Answer:

```
#include <stdio.h>

int main() {
char ch;
int i = 1;
printf("Enter keyboard inputs (type 'A' to exit):\n");
do {
ch = getchar();
printf("Input %d: %c\n", i++, ch);
} while (ch != 'A');
printf("Exiting...\n");
return 0;
}
```

Output:

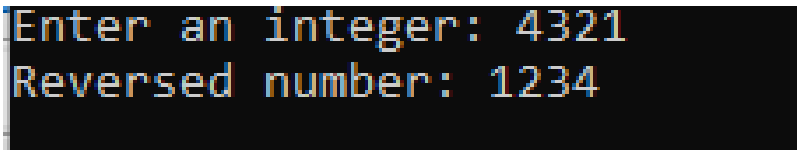


Q8. Write a program (WAP) that will reverse the digits of an input integer.

Answer:

```
#include <stdio.h>
int main() {
int num, rev_num = 0;

printf("Enter an integer: ");
scanf("%d", &num);

while (num != 0) {
int digit = num % 10;
rev_num = rev_num * 10 + digit;
num /= 10;
}
printf("Reversed number: %d\n", rev_num);

return 0;
}
```

Output:



Q9. Write a program (WAP) that will find the grade of N students. For each student, it will take the marks of his/her the attendance (on 5 marks), assignment (on 10 marks), class test (on 15 marks), midterm (on 50 marks), term final (on 100 marks).

Answer:

```
#include <stdio.h>
int main() {
int n, i;
float attendance, assignment, class_test, midterm, term_final, total_marks, percentage;
char grade;
printf("Enter the number of students: ");
scanf("%d", &n);

for (i = 1; i <= n; i++) {
printf("Enter the marks of student %d:\n", i);

printf("Attendance (out of 5): ");
scanf("%f", &attendance);

printf("Assignment (out of 10): ");
scanf("%f", &assignment);

printf("Class Test (out of 15): ");
scanf("%f", &class_test);

printf("Midterm (out of 50): ");
scanf("%f", &midterm);
printf("Term Final (out of 100): ");
scanf("%f", &term_final);
total_marks = attendance + assignment + class_test + midterm + term_final;
percentage = (total_marks / 180) * 100;

      if (percentage >= 90) {
grade = 'A';
} else if (percentage >= 80) {
grade = 'B';
} else if (percentage >= 70) {
grade = 'C';
} else if (percentage >= 60) {
grade = 'D';
} else {
grade = 'F';
}
printf("Total marks: %.2f\n", total_marks);
printf("Percentage: %.2f%%\n", percentage);
printf("Grade: %c\n", grade);
}
return 0;
}
```

Output:

```
Enter the number of students: 25
Enter the marks of student 1:
Attendance (out of 5): 5
Assignment (out of 10): 10
Class Test (out of 15): 15
Midterm (out of 50): 48
Term Final (out of 100): 98
Total marks: 176.00
Percentage: 97.78%
Grade: A
```

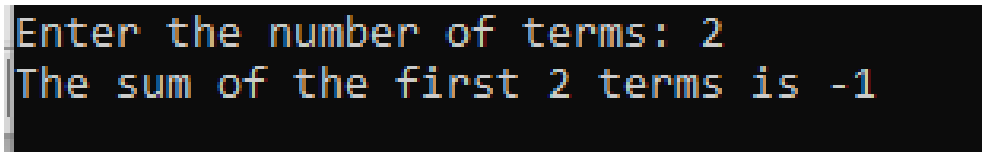
Q10. Write a program (WAP) that will give the sum of first Nth terms for the following series.

1,-2,3,-4,5,-6,7,-8,9,-10, 11,-12, 13, -14,……

Answer:

```
#include <stdio.h>
int main() {
   int n, i, num = 1, sign = 1, sum = 0;

   printf("Enter the number of terms: ");
   scanf("%d", &n);

   for (i = 1; i <= n; i++) {
      sum += num * sign;
      num++;

      if (num % 2 == 0) {
         sign = -1 * sign;
      }
   }
   printf("The sum of the first %d terms is %d\n", n, sum);
   return 0;
}
```

Output:



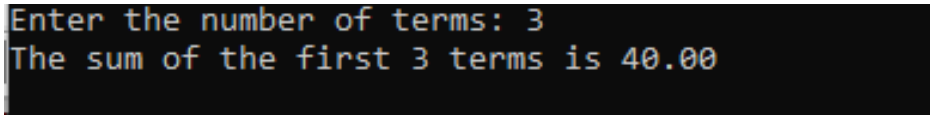
Q11. Write a program (WAP) that will calculate the result for the first Nth terms of the following series. [In that series sum, dot sign (.) means multiplication]

1*2.2+2*2.3+3*2.4 +4*2.5+……

Answer:

```
#include <stdio.h>
int main() {
   int n, i;
   float sum = 0;

   printf("Enter the number of terms: ");
   scanf("%d", &n);

   for (i = 1; i <= n; i++) {
      sum += i * (i + 1) * 2;
   }
   printf("The sum of the first %d terms is %.2f\n", n, sum);

   return 0;
}
```

Output:

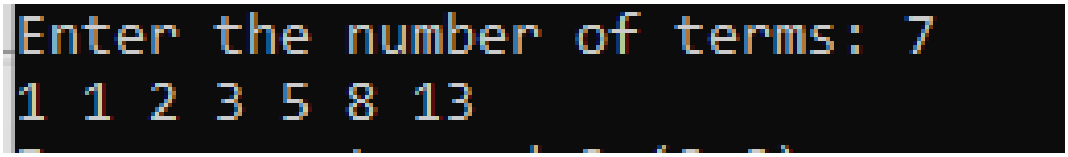


Q12. Write a program (WAP) that will print Fibonacci series upto Nth terms.
1,1,2,3,5, 8, 13, 21, 34, 55, 89,.....

Answer:

```
#include <stdio.h>

int main() {
   int n, i;
   long long int a = 0, b = 1, c;

   printf("Enter the number of terms: ");
   scanf("%d", &n);

   for (i = 1; i <= n; i++) {
      printf("%lld ", b);
      c = a + b;
      a = b;
      b = c;
   }
   return 0;
}
```

Output:

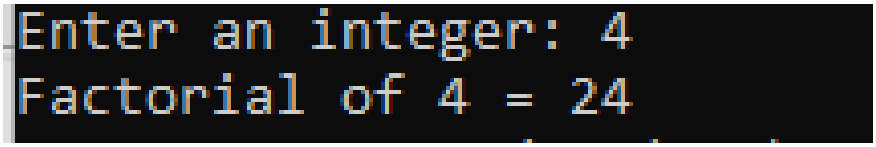


Q13. Write a program (WAP) that will print the factorial (N!) of a given number N

Answer:

```
#include <stdio.h>
int main() {
   int n, i;
   unsigned long long fact = 1;

   printf("Enter an integer: ");
   scanf("%d", &n);

   for (i = 1; i <= n; ++i) {
      fact *= i;
   }
   printf("Factorial of %d = %llu", n, fact);
   return 0;
}
```

Output:



Q14. Write a program (WAP) that will find nCr where n >= r; n and r are integers

Answer:

```
#include <stdio.h>
int factorial(int n);
int nCr(int n, int r);

int main() {
int n, r;

printf("Enter n and r (n >= r): ");
scanf("%d %d", &n, &r);

printf("%dC%d = %d", n, r, nCr(n, r));
return 0;
}

int factorial(int n) {
int i, fact = 1;
for (i = 1; i <= n; ++i) {
fact *= i;
}
return fact;
}
int nCr(int n, int r) {
int num, den;
num = factorial(n);
den = factorial(r) * factorial(n - r);
return num / den;
}
```

Qutput:

```
Enter n and r (n >= r): 10
3
10C3 = 120
```

Q15. Write a program (WAP) that will find (x to the power y) where x, y are positive integers.

Answer:

```
#include <stdio.h>
int power(int x, int y);

int main() {
int x, y;

printf("Enter x and y (both positive integers): ");
scanf("%d %d", &x, &y);

printf("%d to the power %d = %d", x, y, power(x, y));
return 0;
}

int power(int x, int y) {
int result = 1, i;
for (i = 1; i <= y; ++i) {
result *= x;
}
return result;
}
```

Output:

```
Enter x and y (both positive integers): 5
2
5 to the power 2 = 25
```

Q16. WAP that will find the GCD (greatest common divisor) and LCM (least common multiple) of two positive integers

Answer:

```
#include <stdio.h>
int gcd(int x, int y);
int lcm(int x, int y);

int main() {
   int x, y;

   printf("Enter two positive integers (x, y): ");
   scanf("%d %d", &x, &y);

   printf("GCD of %d and %d = %d\n", x, y, gcd(x, y));
   printf("LCM of %d and %d = %d", x, y, lcm(x, y));
   return 0;
}
int gcd(int x, int y) {
   int temp;
   while (y != 0) {
      temp = x % y;
      x = y;
      y = temp;
   }
   return x;
}
int lcm(int x, int y) {
   return (x * y) / gcd(x, y);
}
```

Output:

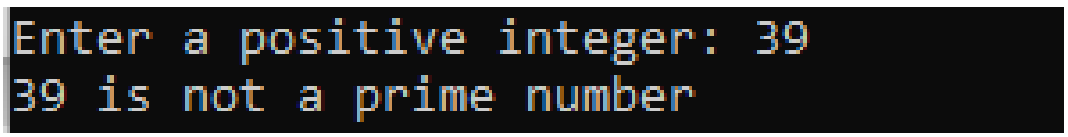
```
Enter two positive integers (x, y): 12
32
GCD of 12 and 32 = 4
LCM of 12 and 32 = 96
```

Q17. WAP that will determine whether a number is prime or not

Answer:

```
#include <stdio.h>
int is_prime(int n);

int main() {
int n;
printf("Enter a positive integer: ");
scanf("%d", &n);

if (is_prime(n)) {
printf("%d is a prime number", n);
} else {
printf("%d is not a prime number", n);
}
return 0;
}
int is_prime(int n) {
if (n <= 1) {
 return 0;
}
for (int i = 2; i * i <= n; i++) {
if (n % i == 0) {
return 0;
}
}
return 1;
}
```

Output:

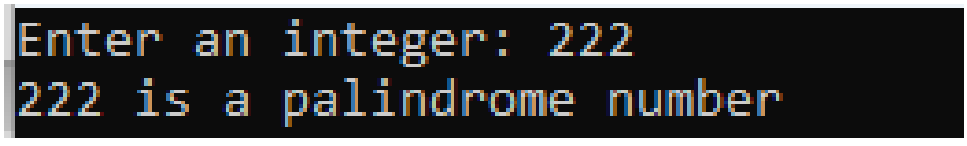


Q18. WAP that will determine whether an integer is palindrome number or not.

Answer:

```
#include <stdio.h>
int is_palindrome(int n);

int main() {
int n;

printf("Enter an integer: ");
scanf("%d", &n);

if (is_palindrome(n)) {
printf("%d is a palindrome number", n);
} else {
printf("%d is not a palindrome number", n);
}
return 0;
}
int is_palindrome(int n) {
int reverse = 0, temp = n;

while (temp != 0) {
reverse = (reverse * 10) + (temp % 10);
temp /= 10;
}
return (n == reverse);
}
```

Output:



Q19.WAP that will calculate following mathematical function for the input of x.
Sinx = (x- x*3/3!) +(x*5 /5!)- (x*7 /7!)+.....

Answer:

```
#include <stdio.h>
#include <math.h>

double sinx(double x);

int main() {
double x;
printf("Enter a value for x (in radians): ");
scanf("%lf", &x);

printf("sin(%lf) = %lf", x, sinx(x));

return 0;
}
double sinx(double x) {
double term, sum = 0.0;
int sign = 1, denominator = 1;

for (int i = 1; i <= 5; i++) {
term = (pow(x, i) / denominator) * sign;
sum += term;
sign = -sign;
denominator *= (2 * i) * (2 * i + 1);
}
return sum;
}
```

Output:

```
Enter a value for x (in radians): 1
sin(1.000000) = 0.841471
```

Q20. Write a program that takes an integer number n as input and find out the sum of the following series up to n terms.

1+12+123 + 1234+.....

Answer:

```
#include <stdio.h>
int main() {
   int n, sum = 0, term = 0;

   printf("Enter the value of n: ");
   scanf("%d", &n);

   for (int i = 1; i <= n; i++) {
      term = (term * 10) + i;
      sum += term;
   }
   printf("The sum of the series up to %d terms is: %d", n, sum);

   return 0;
}
```

Output: