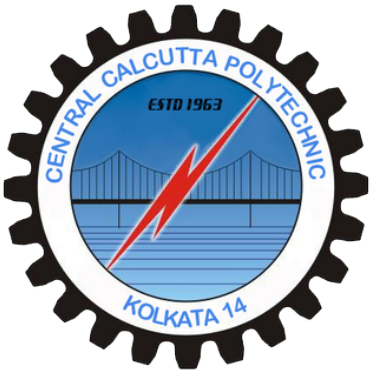

CENTRAL CALCUTTA POLYTECHNIC

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DEPT. : COMPUTER SCIENCE AND TECHNOLOGY

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- SUBJECT : PROGRAMMING IN C
- SESSION : 2020 - 21

Contents

1 C Basics : Input & Outputs

1.1 Write a C program to perform input/output of all basic data types.

Source Code :

```c
#include <stdio.h>

int main()
{
  int a;
  float b;
  char c;

  // Input Step
  printf("Enter an integer: ");
  scanf("%d", &a);
  printf("Enter a float: ");
  scanf("%f", &b);
  printf("Enter a char: ");
  // workaround to scanf [char] for gcc & clang
  // [space] before [format specifier]
  scanf(" %c", &c);

  // Output Step
  // appending [.2] before [f]
  // limits number of significant
  // digits to 2
  printf("Integer: %d, Float: %.2f, Char: %c\n", a, b, c);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [?]
➜ gcc A01_P01.c && ./a.out
Enter an integer: 12
Enter a float: 13.253
Enter a char: n
Integer: 12, Float: 13.25, Char: n
```

1.2 Write a C program to enter two numbers and find their sum.

Source Code :

```c
#include <stdio.h>

int main()
{
  // Using [int] as data-type as no other
  // type is specified in statement.
  int a, b;

  printf("Enter first integer: ");
  scanf("%d", &a);
  printf("Enter second integer: ");
  scanf("%d", &b);

  int sum = a + b;

  printf("Sum of %d and %d is: %d\n", a, b, sum);

  return 0;
}
```

Program Output :

```
assignment/c-language on  master [+?] took 12s
➜ gcc A01_P02.c && ./a.out
Enter first integer: 10
Enter second integer: 19
Sum of 10 and 19 is: 29
```

1.3 Write a C program to enter two numbers and perform all arithmetic operations.

Source Code :

```c
#include <stdio.h>

int main()
{
  // Using [float] as data-type as no other
  // type is specified in statement and
  // as we will perform division.
  float a, b;

  printf("Enter first number: ");
  scanf("%f", &a);
  printf("Enter second number: ");
  scanf("%f", &b);

  // addition
  float sum = a + b;
  // substruction
  float sub_b_from_a = a - b;
  // multiplication
  float mul = a * b;
  // division
  float a_div_by_b = a / b;

  // limiting significant digits
  // after point to 2
  printf("Sum: %.2f\n", sum);
  printf("Sub: %.2f\n", sub_b_from_a);
  printf("Mul: %.2f\n", mul);
  printf("Div: %.2f\n", a_div_by_b);

  return 0;
}
```

Program Output :

```
assignment/c-language on  master [+?] took 9s
➜ gcc A01_P03.c && ./a.out
Enter first number: 53
Enter second number: 29
Sum: 82.00
Sub: 24.00
Mul: 1537.00
Div: 1.83
```

1.4 Write a C program to enter length and breadth of a rectangle and find its perimeter.

Source Code :

```c
#include <stdio.h>

int main()
{
  float length, breadth;

  printf("Enter Length: ");
  scanf("%f", &length);
  printf("Enter Breadth: ");
  scanf("%f", &breadth);

  float perimeter = 2 * (length + breadth);

  printf("Perimeter: %.2f\n", perimeter);

  return 0;
}
```

Program Output :

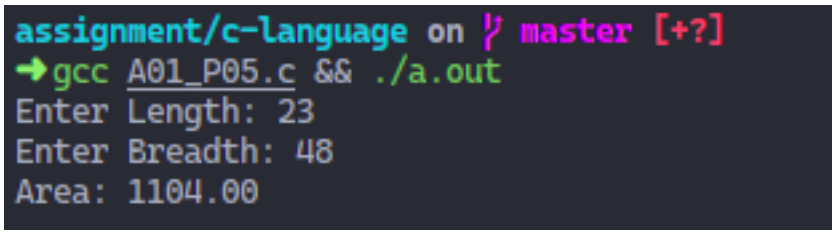
```
assignment/c-language on  master [+?] took 1m 18s
➜ gcc A01_P04.c && ./a.out
Enter Length: 34
Enter Breadth: 22
Perimeter: 112.00
```

1.5 Write a C program to enter length and breadth of a rectangle and find its area.

Source Code :

```c
#include <stdio.h>

int main()
{
  float length, breadth;

  printf("Enter Length: ");
  scanf("%f", &length);
  printf("Enter Breadth: ");
  scanf("%f", &breadth);

  float area = length * breadth;

  printf("Area: %.2f\n", area);

  return 0;
}
```

Program Output :



1.6 Write a C program to enter radius of a circle find its diameter, circumference and area.

Source Code :

```c
#include <stdio.h>

int main()
{
  const float PI = 3.14;

  float radius;

  printf("Enter the Radius of the Circle: ");
  scanf("%f", &radius);

  float diameter = 2 * radius;
  float circumference = 2 * PI * radius;
  float area = PI * radius * radius;

  printf("Diameter: %.2f Unit\n", diameter);
  printf("Circumference: %.2f Unit\n", circumference);
  printf("Area: %.2f Unit\n", area);

  return 0;
}
```

Program Output :

```
assignment/c-language on  master [+?] took 7s
➜ gcc A01_P06.c && ./a.out
Enter the Radius of the Circle: 13
Diameter: 26.00 Unit
Circumference: 81.64 Unit
Area: 530.66 Unit
```

1.7 Write a program to enter length in cm and convrt it into meter and kilometer.

Source Code :

```c
// Write a program to enter length in cm and convrt it into meter and kilometer
#include <stdio.h>

int main()
{
  float cm, me, km;

  printf("Enter length to convert (in cm) : ");
  scanf("%f", &cm);

  me = cm / 100;
  km = cm / (100 * 1000);

  printf("%.2f CM = %0.2f Meters = %.4f Kilometers\n", cm, me, km);

  return 0;
}
```

Program Output :

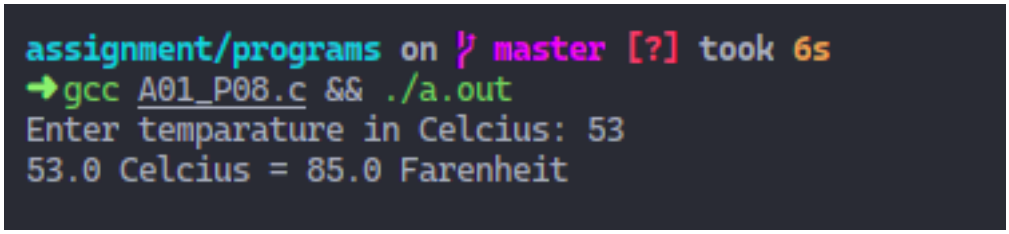
```
assignment/programs on  master [?] took 10s
➜ gcc A01_P07.c && ./a.out
Enter length to convert (in cm) : 1569
1569.00 CM = 15.69 Meters = 0.0157 Kilometers
```

1.8 Write a program to enter temperature in Celsius and convert it into Farenheit.

Source Code :

```c
#include <stdio.h>

int main()
{
  float cel, far;

  printf("Enter temparature in Celcius: ");
  scanf("%f", &cel);

  far = (cel * (9 / 5)) + 32;

  printf("%.1f Celcius = %0.1f Farenheit\n", cel, far);

  return 0;
}
```

Program Output :



1.9 Write a program to enter temperature in Farenheit and convert it into Celsius.

Source Code :

```c
#include <stdio.h>

int main()
{
  int far, cel;

  printf("Enter temparature in Farenheit: ");
  scanf("%d", &far);

  cel = (far - 32) * 5 / 9;

  printf("%d Farenheit = %d Celsius\n", far, cel);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [?]
➜ gcc A01_P09.c && ./a.out
Enter temparature in Farenheit: 100
100 Farenheit = 37 Celsius
```

1.10 Write a C program to convert days into years, weeks and days.

Source Code :

```c
#include <stdio.h>
int main()
{
  int d, y, w;
  printf("Enter days: ");
  scanf("%d", &d);
  y = d / 365;
  d = d % 365;
  w = d / 7;
  d = d % 7;
  printf("%d Years, %d Weeks and %d Days\n", y, w, d);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [?] took 7s
➜ gcc A01_P10.c && ./a.out
Enter days: 563
1 Years, 28 Weeks and 2 Days
```

1.11 Write a C program to find xy of any number x and power y.

Source Code :

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

int main()
{
  int a, b, p;
  printf("Enter two numbers: ");
  scanf("%d%d", &a, &b);
  p = pow(a, b);
  printf("%d to the power %d is: %d\n", a, b, p);

  return 0;
}
```

Program Output :

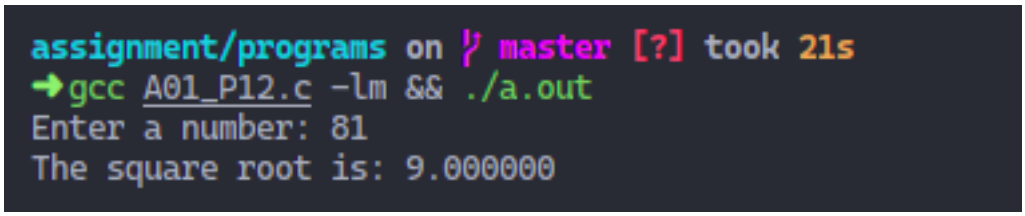
```
assignment/programs on  master [?] took 11s
➜ gcc A01_P11.c -lm && ./a.out
Enter two numbers: 2
5
2 to the power 5 is: 32
```

1.12 Write a C program to enter any number and calculate its square root.

Source Code :

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

int main()
{
  float no, s;
  printf("Enter a number: ");
  scanf("%f", &no);
  s = sqrt(no);
  printf("The square root is: %f\n", s);
  return 0;
}
```

Program Output :



1.13 Write a C program to enter two angles of a triangle and find its third angle.

Source Code :

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

int main()
{
  int a, b, c;
  printf("Enter first angle: ");
  scanf("%d", &a);
  printf("Enter second angle: ");
  scanf("%d", &b);

  c = 180 - a - b;

  printf("Third angle: %d\n", c);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [+]
➜ gcc A01_P13.c -lm && ./a.out
Enter first angle: 60
Enter second angle: 25
Third angle: 95
```

1.14 Write a C program to enter base and height of a triangle and find its area.

Source Code :

```c
#include <stdio.h>

int main()
{
  int b, h, area;
  printf("Enter base of the triangle: ");
  scanf("%d", &b);
  printf("Enter height of the triangle: ");
  scanf("%d", &h);

  area = 0.5 * b * h;

  printf("Area of the triangle: %d\n", area);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [✘?] took 9s
➜ gcc A01_P14.c && ./a.out
Enter base of the triangle: 32
Enter height of the triangle: 12
Area of the triangle: 192
```

1.15 Write a C program to calculate area of an equilateral triangle.

Source Code :

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

int main()
{
  int s;
  double area;
  printf("Enter length of the side: ");
  scanf("%d", &s);

  area = (sqrt(3) / 4) * pow(s, 2);

  printf("Area of the equilateral triangle: %d\n", area);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [✘!?]
➜ gcc A01_P15.c -lm && ./a.out
Enter length of the side: 12
Area of the equilateral triangle: 918
```

1.16 Write a C program to enter marks of five subjects and calculate total, average and percentage.

Source Code :

```c
#include <stdio.h>

int main()
{
  int s1, s2, s3, s4, s5, total;
  float avg, per;
  printf("Enter marks of 5 subjects: ");
  scanf("%d%d%d%d%d", &s1, &s2, &s3, &s4, &s5);
  total = s1 + s2 + s3 + s4 + s5;
  avg = (float)total / 5;
  printf("Avg is : %f\n", avg);
  return 0;
}
```

Program Output :

```
assignment/programs on  master [✘!?] took 8s
➜ gcc A01_P16.c -lm && ./a.out
Enter marks of 5 subjects: 63
70
95
46
72
Avg is : 69.199997
```

1.17 Write a C program to enter P, T, R and calculate Simple Interest.

Source Code :

```c
#include <stdio.h>

int main()
{
  int p, t;
  float r, i, total;
  printf("Principal Amount: ");
  scanf("%d", &p);
  printf("Time Period (In Years): ");
  scanf("%d", &t);
  printf("Interest Rate (Percent): ");
  scanf("%f", &r);

  i = p * t * r / 100;
  total = p + i;

  printf("Interest Amount: %.2f, Total Amount: %.2f\n", i, total);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [✘!?] took 24s
➜ gcc A01_P17.c && ./a.out
Principal Amount: 1250
Time Period (In Years): 5
Interest Rate (Percent): 5.3
Interest Amount: 331.25, Total Amount: 1581.25
```

1.18 Write a C program to enter P, T, R and calculate Compound Interest.

Source Code :

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

int main()
{
  double p, t;
  double r, i, total;
  printf("Principal Amount: ");
  scanf("%lf", &p);
  printf("Time Period (In Years): ");
  scanf("%lf", &t);
  printf("Interest Rate (Percent): ");
  scanf("%lf", &r);

  total = (double)p * pow((1 + (r / 100)), t);

  i = total - p;

  printf("Interest Amount: %.2lf, Total Amount: %.2lf\n", i, total);

  return 0;
}
```

Program Output :

```
assignment/programs on  master [✘!?] took 10s
➜ gcc A01_P18.c -lm && ./a.out
Principal Amount: 1000
Time Period (In Years): 2
Interest Rate (Percent): 5
Interest Amount: 102.50, Total Amount: 1102.50
```