	INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
Programming in C and C++ (CST-501)	

Assignment 3

Q-1) Write a C program to compute the area, circumference, and diameter of a circle. Use `PI` as a macro in your program, and also include the standard header file that provides the value of `PI`. Ensure both methods of using `PI` are implemented correctly and clearly in the code. **[5 marks]**

Q-2) Write a C program to take input for principal (P) and time (t), then compute the final amount (A) using the below formula. ***[For example : If you enter P: 100000, t: 6, the A is 170778.56]*** **[5 marks]**

$$A = P\left(1 + \frac{9}{5 \times 100}\right)^{5t}$$

Q-3) You are developing an application for embedded systems with limited memory. To optimize your program and ensure it fits within memory constraints, you need to find out how much memory different data types like integers, floating-point numbers, and characters occupy on the target machine. Write a C program that helps you inspect the memory size (in bytes) required to store different primitive data types on the system where the program runs. **[5 marks]**

Q-4) Write a program to convert a small letter char to a capital letter char and vice-versa - a -> A, b -> B , B -> b…….

[15 marks]

[Note : Do NOT use any `if` statements or conditional operators (`?:`). Use only arithmetic operators (`+, -, *, /, %`) for computations. Use the following header files and their features:

`#include <stdbool.h>:` to declare variables of type `bool` (which stores values 1 or 0)

`#include <ctype.h>:` to use the functions `islower(ch)` and `isupper(ch)` to check whether a character (ch) is lowercase or uppercase.]

Q-5) Declare a float type variable e= 2.718281828 and print the following using variable e. **[15 marks]**

3
3.
2.7
2.72
2.718282
2.718282
2.7182818

Q-6) Write a C programme to print formatted output using different variables. Let's say a=1,b=12,c=123,d=1234,f=12345. Print the values of a to f such that it looks like as shown in a. Similarly take different character type variables and print these variables as shown in b. *[Do not use space or print '0' to get the desired output]* **[15 marks]**

a)

```
00001
00012
00123
01234
12345
```

b)

```
a
ab
abc
abcd
abcde
```

Q-7) Take an integer number of seconds as input, print the equivalent time in hours, minutes, and seconds as output. The recommended output format is: 7322 seconds is equivalent to 2 hours, 2 minutes, and 2 seconds.
[10 marks]

Q-8) Write a C program to reverse a 3-digit number without using a loop. [10 marks]

Q-9) Write a C program to print the corresponding Celsius to Fahrenheit. Print as floating point, 3 numbers after decimal point. [10 marks]

Formula : **F = (9/5 * C) + 32**

Q-10) Take the input x, y coordinate of a point, calculate and print the squared distance of the point from the origin. [10 marks]

Q-11) Write a program to swap two numbers without using a third variable. [10 marks]

Q-12) Write a C program to take a 3-digit number as input and print whether the number is an Armstrong number or not. (*An Armstrong number is a number for which the sum of the cubes of its digits equals the number itself, e.g., 153 = 1^3 + 5^3 + 3^3*) [10 marks]