Ghulam Ishaq Khan Institute (GIKI)

Assignment # 1

Subject: Introduction to Computing & AI	**Course Code:** CS-101-A-Fall-24
Class: BS AI – 1st, **Batch:** 34 - Fall - 24	**Submission Deadline:** 29/Sep/2024-Sun (11:59-PM)
Instructor: M. Qasim Riaz, **TA:** Miss Amna Arooj	**Total Marks:** 70 (Marks are divided question wise)

Note (Read notes & instructions first)

- First of all, read the instructions and statements of each exercise/question carefully then write the solution.
- It is written in front of each question that you have to upload it as handwritten or C++ code file.
- *For Handwritten:*
  - Give heading of each question's number or the exercise you are going to solve (don't write statement of question)
  - Mention page number and your roll number at corner of each page.
  - Take pictures using applications like camscanner on your phone.
  - Then select all pictures in the camscanner application and convert them into a pdf file using option in application.
  - The name of your pdf file should contain your assignment number and your roll number as shown in following example, For Example if your roll number is 2024532 and you have done assignment number 2 then the name of file should be as ---> 2024532_2.pdf
  - Then upload that pdf file at Microsoft teams. Remember the sequence of pages should be right.
  - Also keep the same original pages/hardcopy with you so that you can show/submit me later if required.

- *For C++ Code File:*
  - Create different file for each question & assignment
  - Name of each file should contain your roll number, assignment number & question number in a specific format.
  - <u>For Example</u>, if your roll number is 2024532 you are doing 2nd assignment and question no 5 then file name of your C++ file should be written as ---> 2024532_2_5.cpp (Similarly, create for each question)
  - Now upload all of these files at Microsoft teams.

  CHEATING/COPY CASE or **LATE SUBMISSION** even 1 minute late will be graded as **STRAIGHT ZERO MARKS**.
  So be on time make no excuse.

Exercise – 1 (Read Carefully)

Write the C++ code for the different programs stated in questions given below, most the programs are related to implementation of mathematical formulas and calculations.

70 – Marks   (CLO - 2, 3)

Question: 1   (Hand Written & C++ Code File)   **5 - Marks**

Write a program in C++ which should find the power of a number. To perform this task, take two variables `num` and `power` as input using `cin` command and find power of number as told in hint below.

<u>Hint:</u> to find power of any number in C++ we use this ^ operator. For example: If want to find 2^4 in C++ then we will have to write it in following way:

`2^4`   ---> its answer will be 16

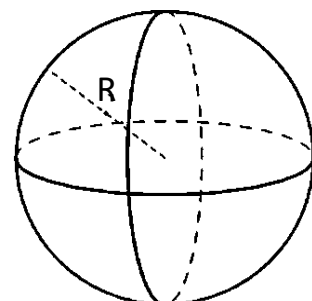**Question: 2   (Hand Written & C++ Code File)**   **10 - Marks**

Write a program that inputs radius of sphere from user using `cin` command. It should calculate its circumference and surface area using the given formulas:

Area = $4\pi R^2$

Circumference = $4/3\pi R^3$
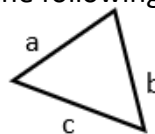
where 'R' is radius of sphere

<u>Hint:</u> Remember answer can be in points so use data-type accordingly.
For value of π in formula you can use 3.14 with other variables of float type.

Question: 3   **(Hand Written & C++ Code File)**   **15 - Marks**

Write a program to find out the area of triangle. As we know triangle have three sides a, b, c as shown in figure below. The program should cin the values of a, b, c from user. Use the following formula to find the area in your c++ code.

$$\text{Area} = \sqrt{s\,(s - a)\,(s - b)\,(s - c)} \quad \text{where} \quad s = (a + b + c)/2$$

Hint: While creating the above program add a new header file `#include<math.h>` under the already present line `#include<iostream>` then use `sqrt()` function to find the square root of any value. For example: if you want to find square root of 4 in C++ the code will be as following:

```
int x = 4;
int answer = sqrt (x);      ---> Remember this function will work only if you will add #include<math.h>
cout << answer;             ---> The answer will be 2
```

Question: 4   **(Hand Written & C++ Code File)**   **10 - Marks**

Write a program in C++ that takes age in years from user using cin command. Then perform some calculations and first shows age of user in months and then shows in days separately.

Hint: As we know that a year contains 12 months so if a child is of 2 years, then his/her age will be **2 x 12** means 24 months. Similarly, you can find days for same child.

Question: 5   **(Hand Written & C++ Code File)**   **15 - Marks**

If a Honda CD 70 motorcycle can travel 50.2 Kilometers in 1 liter of petrol and a Honda CG 125 motorcycle can travel 40.5 Kilometers in 1 liter of petrol. Now write a program that takes distances in Kilometers as input from user and finds how much petrol be required to cover that distance for both CD 70 and CG 125 bike, Show output for both separately.

Hint: For example: If user want to cover 200 kilometers of distance, then your program should show petrol consumption for both CD 70 and CG 125 bike. First try to solve it mathematically then write its program.

Question: 6   **(Hand Written & C++ Code File)**   **15 – Marks**

Dream-Tech is an international organization which provides different kinds of allowances to its employees. Each employee at Dream-Tech gets the following allowances as percentage of their basic salary:

House Allowance   30%   of basic salary
Transport Allowance   10%   of basic salary
Medical Allowance   25%   of basic salary

Total/Gross Salary = Basic Salary + House Allowance + Transport Allowance + Medical Allowance

I want to you to write a program where you will create a variable "basicSalary" and get its value as input from user. After taking the input you will calculate the all the three allowances as per the above-mentioned percentages and then you will calculate the total/gross salary by adding all of these allowances.
Once above work is done then do the following task in the same program
Now if Dream-Tech is going to increase some its allowances to give more benefit its employees. So, the new allowances as following:

New House Allowance   40%   of basic salary
New Transport Allowance   15%   of basic salary
New Medical Allowance   35%   of basic salary

Now use the same "basicSalary" variable which was created (above) previously and find the new allowances and also find the total/gross salary on the basis of new allowances. After that find and show the difference between then old total/gross salary and new total/gross/salary

Hint: For example: First learn how to find simple percentage in python then learn. Then see how you compete with others.

o --- | --- Good Luck --- | --- o