**Sample Assessment for Introduction to Programming**

This assessment is designed to evaluate your understanding of basic programming concepts in C#, HTML, CSS, and JavaScript.

Instructions: Read each question carefully and provide complete and clear answers. Avoid multiple-choice format responses. Focus on demonstrating your understanding through code, explanations, and discussions.

Part 1: C# (30 points)

(10 points) Write a C# program that calculates the area of a triangle given its base and height. Include user input for both values and display the calculated area.

**using System;**

**class Program**

**{**

**static void Main(string[] args)**

**{**

**Console.WriteLine("Please enter the base of the triangle:");**

**double baseLength = Convert.ToDouble(Console.ReadLine());**

**Console.WriteLine("Please enter the height of the triangle:");**

**double height = Convert.ToDouble(Console.ReadLine());**

**double area = CalculateTriangleArea(baseLength, height);**

**Console.WriteLine($"The area of the triangle with base {baseLength} and height {height} is: {area}");**

**}**

**static double CalculateTriangleArea(double baseLength, double height)**

**{**

**return 0.5 \* baseLength \* height;**

**}**

**}**

(10 points) Declare an array of 5 integers and fill it with values based on a user-defined formula (e.g., n^2). Then, print the largest element in the array.

**using System;**

**class Program**

**{**

**static void Main(string[] args)**

**{**

**int[] numbers = new int[5];**

**Console.WriteLine("Enter the formula to generate the numbers (e.g., n^2):");**

**string formula = Console.ReadLine();**

**for (int i = 0; i < numbers.Length; i++)**

**{**

**int n = i + 1;**

**numbers[i] = EvaluateFormula(formula, n);**

**}**

**Console.WriteLine("Array elements:");**

**foreach (int number in numbers)**

**{**

**Console.WriteLine(number);**

**}**

**int maxNumber = FindMax(numbers);**

**Console.WriteLine($"The largest element in the array is: {maxNumber}");**

**}**

**static int EvaluateFormula(string formula, int n)**

**{**

**int result = 0;**

**switch (formula)**

**{**

**case "n^2":**

**result = n \* n;**

**break;**

**default:**

**Console.WriteLine("Unsupported formula.");**

**break;**

**}**

**return result;**

**}**

**static int FindMax(int[] array)**

**{**

**int max = array[0];**

**for (int i = 1; i < array.Length; i++)**

**{**

**if (array[i] > max)**

**{**

**max = array[i];**

**}**

**}**

**return max;**

**}**

**}**

(10 points) Implement a simple for loop that iterates from 1 to 10 and prints each number along with its square root.

**using System;**

**class Program**

**{**

**static void Main(string[] args)**

**{**

**for (int i = 1; i <= 10; i++)**

**{**

**double squareRoot = Math.Sqrt(i);**

**Console.WriteLine($"Number: {i}, Square Root: {squareRoot}");**

**}**

**}**

**}**

Part 2: HTML, CSS, and JavaScript (30 points)

HTML (10 points): You are provided with the following incomplete HTML code snippet:

**HTML**

**<!DOCTYPE html>**

**<html>**

**<style>**

**h3 {**

**font-color: red;**

**}**

**</style>**

**<head>**

**<title>My Website</title>**

**</head>**

**<body img src=”Null.jpg”>**

**<h1>Welcome to...</h1>**

**<p>This is a paragraph...</p>**

**<ol>**

**<li>Item 1</li>**

**<li>Item 2</li>**

**<li>Item 3</li>**

**</ol>**

**<ul>**

**<li>Item 1</li>**

**<li>Item 2</li>**

**</ul>**

**<p> <a href="https://youtube.com">hyperlink</a>.</p>**

**</body>**

**</html>**

Complete the code snippet by adding the following elements:

An image within the <body> tag with a relevant src attribute.

An ordered list (<ol>) with three items.

A hyperlink within a <p> tag that points to an external website.

A CSS styling rule using an inline style attribute to change the font color of the <h3> heading.

CSS (10 points): Create a CSS stylesheet that defines the following styles:

Change the background color of the body element to light blue.

Apply a padding of 20px to all headings (h1, h2, h3).

Set the font size of the <p> tag to 14px.

Make the list items (li) have a bullet point style instead of the default numbers.

**body {**

**background-color: lightblue;**

**}**

**h1, h2, h3 {**

**padding: 20px;**

**}**

**p {**

**font-size: 14px;**

**}**

**li {**

**list-style-type: disc;**

**}**

JavaScript (10 points): Write a JavaScript function that takes a number as input and returns a string indicating whether the number is even or odd. Then, add a button to your HTML page that, when clicked, calls this function and displays the result (even or odd) in a paragraph element below the button.

**function checkEvenOrOdd(number) {**

**if (number % 2 === 0) {**

**return "even";**

**} else {**

**return "odd";**

**}**

**}**

**<!DOCTYPE html>**

**<html lang="en">**

**<head>**

**<meta charset="UTF-8">**

**<meta name="viewport" content="width=device-width, initial-scale=1.0">**

**<title>Even or Odd Checker</title>**

**</head>**

**<body>**

**<button id="checkButton">Check Even/Odd</button>**

**<p id="resultParagraph"></p>**

**<script src="script.js"></script>**

**</body>**

**</html>**

Part 3: Essay Question (40 points)

Discuss the importance of object-oriented programming (OOP) concepts in software development. Explain the key principles of OOP (encapsulation, inheritance, polymorphism, abstraction) and provide examples of how they can be used to create more efficient, maintainable, and reusable code. Include real-world scenarios or cases where OOP is particularly valuable.

The importance of OOP is for easier manageability and fixing of data by managing them into different classes with their own different function that can be used by calling upon the same data.

Encapsulation- the collective data and methods that can be called on

Inheritance- can inherit function or data from a more broader or bigger system

Polymorphism- by treating different classes a single entity they can call upon different classes to make a new function

Abstraction- hiding different type of intricacies for easier viewing so that the main important function is the only one shown

Uses of OOP

There different real world scenarios these are used from the previous years curriculum which POS systems, Enrollment System, Dental Clinic Reservations, Game Development and normal coding exercises

Points Distribution:

Each part carries equal weight (30 points).

Code clarity, functionality, and explanations will be considered in grading.

The essay question focuses on understanding and application of OOP concepts.