**Department of Statistics & Computer Science**
**University of Kelaniya**
**ACADEMIC YEAR - 2021/2022**
**BECS 12243 / BECS 12243(R) / COSC 22532(R) / COSC 12043(R)**
**Object Oriented Programming**

**Practical Examination**

**Duration: 2 hours**

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**Instructions (Read carefully)**

- Create a folder in the Desktop and name it as YourLastName-2021-XXX, where XXX is the last 3 digits of your student number. (This folder is your working directory)
- Create an IntelliJ Java project inside above folder with the name *YourLastName-2021-XXX*.
- You are not allowed to access the Internet or access any other files and folders other than your working directory.
- Make sure you do not keep mobile phones or any electronic device with you during the exam.

- **Submission:**

  You should submit the following two items into the answer submission folder in EVAL,

  ✓ Full Answer as a MS word document:
    - Include the Content of the Java files (complete source code) into a single word document. Name this document with your student number EC21-XXX. (the header of this document should be your student ID, name, and the course code)
    - Include the screenshot of the final output of the program into above word document.

  ✓ IntelliJ project as a zipped file.

- Note: You are responsible to save your work always including the word file and submit above two items. Once you submit, verify your submission again.

The Digital Art Portfolio is a platform that manages digital artworks, including images, animations, and interactive art for clients' requests. Each artwork class has a method called ***calculateFileSize*** that calculates the output file size. For images and animations, it considers the dimensions (height and width for images and height, width, duration for animations), the base file size (depending on the file format) and multiplies them to calculate the output file size. For interactive art, it takes a base interaction size and the number of interactions to calculate the total file size. Meanwhile, only images and animations can be resized according to a given percentage. The required interfaces and classes are outlined below.

**Interfaces and Classes:**

- ***Artwork*** interface with a method ***calculateFileSize***.
- ***Resizable*** interface with a method ***resize***.
- ***Image*** and ***Animation*** classes implementing ***Artwork*** and ***Resizable***.
- ***InteractiveArt*** class implementing ***Artwork***.

**Specifications:**

File formats for images will be "jpg", "png", or "gif", and animations can be in either "gif", "mp4", or "webm" formats only.

The base interaction size is 8000 bytes.

The base file size for different file formats are given as follows:

jpg Base Size – 2000 bytes;
png Base Size = 2500 bytes;
gif Base Size = 1500 bytes (for both images and animations);
mp4 Base Size = 3000 bytes;
webm Base Size = 3500 bytes.

**Part I**: Write the code for all the interfaces and classes to complete the Digital Art Portfolio system. Identify appropriate attributes and methods for each class. (Hint: Consider the given Artwork objects in Part II) [50 Points]

**Part II**: Create ArtPortfolioClient class to create digital artworks and calculate the file size for each artwork given below: [30 Points]

Image sunsetImage = new Image("Sunset", "jpg", 1920, 1080);
Animation cityAnimation = new Animation("City Life", "mp4", 1280, 720, 300);
Artwork gameArt = new InteractiveArt("Escape Room", 15);

**Part III**: As animations are resizable, reduce the size of the cityAnimation file by 15% of its original size and display the output file size. [20 Points]

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