Computer Graphics

Assignment 1

Name: Kashif Mehmood

Roll No. 11875

Submitted to: Sir Umer Haroon

BSSE(VII)-A (E)

Q. what are different types of augmented reality?

A. Augmented reality (AR) technology adds layers of digital snippets on top of an existing environment, bridging the gap between the virtual and physical world. Using a device's camera, digital content such as graphics, sound, and video, is displayed on-screen to deliver augmented experiences. Unlike virtual reality, augmented reality isn't a fully immersive, artificial experience. Instead, it's comprised of virtual components placed in your immediate surroundings.

Types:

There are several types of augmented reality in use today.

Marker-based AR

Marker-based AR uses markers to trigger an augmented experience. The markers, often made with distinct patterns like QR codes or other unique designs, act as anchors for the technology. When a marker in the physical world is recognized by an augmented reality application, the digital content is placed on top of it.

Markerless AR

Marker-less AR is more versatile than marker-based AR as it allows the user to decide where to put the virtual object. You can try different styles and locations completely digitally, without having to move anything in your surroundings.

Location-based AR

Location-based AR ties digital content and the experience it creates to a specific place. The objects are mapped out so that when a user's location matches the predetermined spot it is displayed on the screen.

Superimposition AR

Superimposition AR recognizes an object in the physical world and enhances it in some way to provide an alternate view. This can include recreating a portion of the object or the whole thing in its entirety.

Projection-based AR

Projection-based AR is a little different than the other types of markerless augmented reality. Namely, you don't need a mobile device to display the content. Instead, light projects the digital graphics onto an object or surface to create an interactive experience for the user.

Q2. Compare OpenGL and WebGL?

OpenGL	WebGL
OpenGL (**Open Graphics Library**) is a cross-language, cross-platform application programming interface (API) for rendering 2D and 3D vector graphics.	**WebGL** (**Web Graphics Library**) is a JavaScript API for rendering interactive 2D and 3D graphics within any compatible web browser without the use of plug-ins.
The API is typically used to interact with a graphics processing unit (GPU), to achieve hardware-accelerated rendering.	WebGL is fully integrated with other web standards, allowing GPU-accelerated usage of physics and image processing and effects as part of the web page canvas.
OpenGL is a desktop computer-centric API (like Direct3D).	WebGL is also designed to run in a browser, and has therefore a few limitations more then OpenGL ES 2.0.

Q3. Explain SVG and its basic commands?

A: **SVG:**SVG stands for Scalable Vector Graphics. **SVG** is used to define vector-based graphics for the Web. **SVG** defines the graphics in XML format. Every element and every attribute in **SVG** files can be animated.

Example:

```
<svg width="100" height="100">
  <circle cx="50" cy="50" r="40" stroke="green" stroke-width="4" fill="yellow" />
</svg>
```

Output:

Path Commands

SVG defines 6 types of path commands, for a total of 20 commands:

- MoveTo: M, m
- LineTo: L, l, H, h, V, v
- Cubic Bézier Curve: C, c, S, s
- Quadratic Bézier Curve: Q, q, T, t
- Elliptical Arc Curve: A, a
- ClosePath: Z, z

Command	Parameters	Notes
M	$(x, y)+$	Move the *current point* to the coordinate x,y. Any subsequent coordinate pair(s) are interpreted as parameter(s) for implicit absolute LineTo (L) command(s) (*see below*).
m	$(dx, dy)+$	Move the *current point* by shifting the last known position of the path by dx along the x-axis and by dy along the y-axis. Any subsequent coordinate pair(s) are interpreted as parameter(s) for implicit relative LineTo (l) command(s) (*see below*).