**Procedure:**

1. Define a simple 3D scene with objects like spheres, cubes, or custom models.
2. Set up a rendering environment using a graphics library or programming language.
3. Implement the rendering loop with dynamic changes to the scene.
4. Apply shading and rendering techniques for realistic appearance.
5. Run the animation and observe the dynamic rendering of the scene.
6. Experiment with different scene configurations and rendering parameters.

**Coding:**

```
#include <graphics.h>
void marph(int x1, int y1, int x2, int y2, int step)
{
 int i;
 for (i=0; i<steps; i++)
 {
   int x = (x1+(x2-x1)*i/steps);
   int y=(y1 + (y2-y1)* i/steps);
   putpixel (x,y,WHITE);
   }
}
int main()
{
 int gd=DETECT,gm;
 initgraph(& gd, &gm, "C://TC//BGI");
 circle(100,100, 50);
 rectangle(200,200, 300,300);
 morph(100,100,200,200,10);
 getch();
 closegraph();
 retur 0;
}
```

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```

## Rendering code:-

```
#include<graphics.h>
void main()
{
 int gd=DETECT,gm;
 initgraph(&gd,&gm,"C:\\TC\\BGI");
 circle(getmaxx()/2,getmaxy()/2,50);
 while(!kbhit())
 {
  cleardevice();
  circle(getmaxx()/2+10 ,getmaxy()/2,50);
  delay(10);
 }
 closegraph();
}
```

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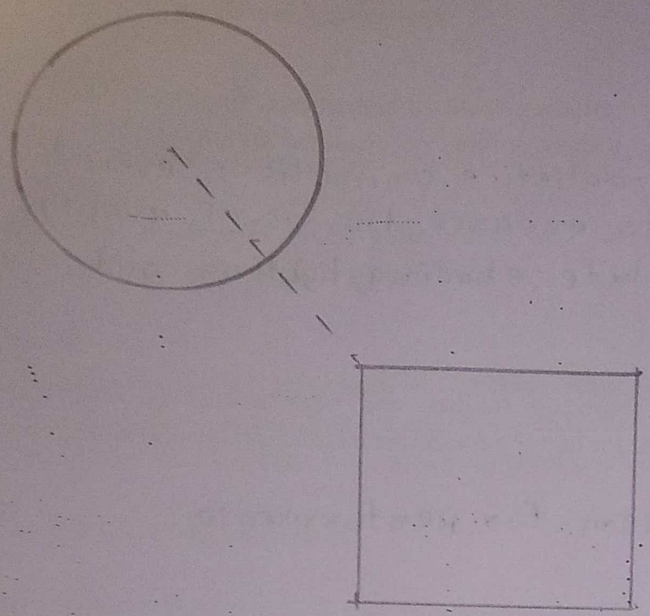
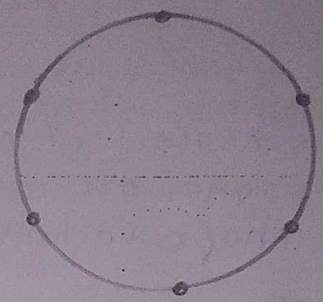
OUTPUT

④ Morphing Animation



⑤ Rendering Animation



**Post Practical Questions:**

**a. Morphing Animation**

1. **Morphing Concept:** Explain the concept of morphing animation and how it differs from traditional frame-based animations. Discuss the key steps involved in achieving a smooth morphing effect.

**Ans:** Morphing Animation is a technique used to smoothly transform one image or shape into another over a sequence of frames.
→ Here are differs from traditional frame based application key shapes or images, interpolation, vector based.

2. **Applications:** Identify and discuss potential applications for morphing animations in real-world scenarios. Consider fields such as entertainment, scientific visualization, or educational purposes.

**Ans:** Entertainment, scientific visualization, educational purposes, user interfaces, Art and design overall morphing animations after a verstuile and powerful technique for creating dynamic visual effects and conversing complex transformations in various real-world seenarios.

**b. Rendered Animation**

1. Discuss rendering techniques used in your program for creating realistic animations. Explore concepts such as shading, lighting, and texture mapping and their impact on the final rendered animation.

**Ans:** In the context of creating realistics animations, several rendering techniques are employed to enhance the visual quality of the output. These techniques include shading, lighting and texture mapping.

2. **Realism vs. Performance:** Analyze the trade-off between realism and performance in rendered animations. Discuss scenarios where sacrificing realism for better performance is acceptable and situations where high realism is crucial.

**Ans:** Acceptable Sacritice of Realism for performance
- Real-time Applications
- Background elements
- low-Ply Alt styles

-) Crucial importance of high realisum
- film and cinematics
- Architectural visualization
- Product visualization

**Conclusion:**

In this practical, we learn about the Morphing Animation and Rendered Animation.

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| Marks out of 10 | 10 |
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4. Use blend shapes or bone-driven deformations to control facial movement.
5. Fine-tune parameters to convey different emotions through facial animation.
6. Render the frames sequentially to create a facial animation.

**Procedure:**

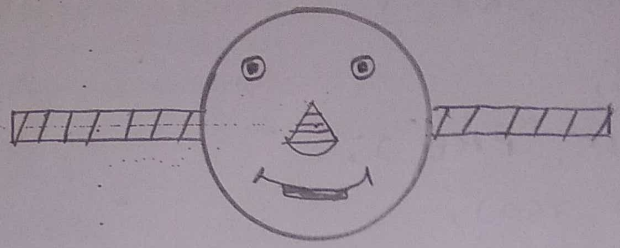
1. Design a facial rig with controls for essential features.
2. Define keyframes representing different facial expressions and emotions.
3. Implement the facial animation algorithm, incorporating blend shapes or bone-driven deformations.
4. Observe the facial expressions and emotions conveyed in the generated animation.
5. Experiment with modifying keyframes and controls to explore variations in facial animation.

**Coding:**

```
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
void main()
{
  int gd=DETECT,gm,i;
  initgraph(&gd, &gm, "C://TC//BGI");
  setcolor(3);
  for(i=2;i<=10;i++)
  {
   for(j=1;j<=15;j++)
   {
    delay(100);
    setcolor(i);
    circle(300,250,200);
    setfillstyle(j,i);
    piesice(300,200,250,290,75);
    bar(500,250,250,300);
    bar(50,250,100,100);
```

```
circle (200, 195, i);
circle(400, 175, i);
circ (300, 210, 330, 450);
picslice (300, 400, 180, 160, i);
pottex style (2, 0, 5);
cut text try (175, 15, "PRE");
line (420, 500, 440, 350);
line (180, 400, 130, 350);
}
}
getch();
closegraph();
return 0;
}
```

OUTPUT



**Post Practical Questions:**

**a. Character Animation**

1. Explain the concepts of rigging and skeletons in character animation. Discuss how they contribute to creating flexible and realistic character movements.

Ans: Rigging and skeltons play a crucial role in character animation by providing animations with the tools to create flexible and realistic movements. They allow for precibe contol over the characters doses and expressions enabling animations to convey motion and personality ettrativlty.

2. Discuss the keyframe animation technique in character animation. Explain how keyframes are used to define significant poses and movements in the animation sequence.

Ans: Keyframe animation technique gives animations precise control over character movements, allowing them to create expressive performances with named gestures and



actions. By strategically placing keyframe and adjusting the animation curves, animators can bring characters to life the believable and dynamic motion.

3. Consider a scenario where two animated characters interact with each other. Discuss the challenges and techniques involved in coordinating the movements of multiple characters in an animation.

Ans: Coordinating the movement of multiple character in animation require careful plugging, attention to detail or collbration among animators by addressing the challenging & applying effective technique & ehancement of the audition.

b. **Facial Animation**

1. Explain the process of facial rigging in character animation. Discuss the role of facial bones and controls in creating expressive facial animations.

Ans: Facial rigging in charactor animation involves creating a digital framework that controls the movement and deformation of a charatcer's tale. This process typically including the following steps: Bone placement weight, painting, contool setup blendshaps/shape keys, expression libraries.

2. Discuss the challenges and techniques associated with lip syncing in facial animation. Explore how accurate synchronization of facial movements with audio enhances the overall animation quality.

Ans: Lip syncing in total animation watching the movement of character lip to pre-recorded dialogue or audio. This process present sevel challenges & require careful attention to achieve.

3. How do you convey different emotions through facial expressions in animation? Discuss the role of facial muscles, controls, and animation principles in portraying various emotions realistically.

Ans: Conveyiag emotions through facial expression is a trandamental aspect of character animation that require a deep understanding of human anatomy, pyshcology and animation principles. Here's how different elements contoribute ~~to~~ portraying various emotions realistically facial masks, contol, Rigging Animation principle.

**Conclusion:**

In this practical we learn about the character animation and facial Animations.

| | |
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traditional 2D drawings or even 3D models on a computer screen.

Time and Cost Savings:

- Iterative design changes were made efficiently in VR, reducing the need for costly physical models or time-consuming revisions during the construction phase.

**Challenges:**

Learning Curve:

- Initially, there was a learning curve for both the design team and the client in using VR technology. However, training sessions mitigated this challenge.

Hardware Requirements:

- Access to VR headsets and powerful computers was necessary, but advancements in technology are making these tools more accessible.

**Conclusion:**

The integration of Virtual Reality in the architectural design process proved transformative in this case study. The immersive nature of VR facilitated better communication, improved decision-making, and ultimately led to a house design that precisely matched the client's vision. As VR technology continues to advance, its adoption in the field of architecture is likely to become more widespread, offering new possibilities for innovation and efficiency in the design and construction industry.

**Post Practical Questions:**

1. Explain the essential components and technologies involved in creating a virtual reality (VR) experience for architectural visualization. Discuss the role of VR headsets, controllers, and immersive environments.

**Ans:** In architectural visutization, VR offers a powerful tool for presenting designs in an immersive and interactive manner the essential components and technologies involved in creating a VR experience for architectural visualization include: VR Headsets, controllers, immersive Environments, Real time Rendering.

2. How can users interact with the virtual architecture in your case study? Discuss the user interface, navigation methods, and any interactive elements incorporated to enhance the VR experience.

**Ans:** In our case study of architectural visualization in VR, users can interact with the virtual architecture through intultive controls and immerssive navigation methods. The following elements are incorporated to enhance the VR experience user interface Navigation Methods, interactive elements, collaborative features and Accesibility options.

3. Evaluate the benefits and challenges of using virtual reality for architectural visualization. Discuss how VR enhances the understanding of architectural designs and potential drawbacks or limitations.

Ans: Benefits of using virtual Reality for Architectural visualization

- immersive experience
- interactive exploration
- Remote collaboration
- Realistic Representation
- early design evaluation

-) Challenges and limtations of virtual Reality for Architectural visualization

- cost and accesibilty
- Technical limitations
- Simulation sickness
- learning curve
- subjective interprestation

| | |
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| Marks out of 10 | 10 |
| Signature with Date of Completion | Dey |