**기초 컴퓨터 그래픽스**

**HW2 README**

20151378 진상우

**1. [환경 명세]**

1) 본인 프로그램의 실제 구동 환경을 명시 할 것 (OS, CPU, GPU, Compiler 등등)

- ex 1) window10 64bit, i9-10980xe, rtx 3090, visual studio 2019 – win 64, release

- ex 2) window10 64bit (mac-vm), i5-8210Y, intel UHD graphic 617,

visual studio 2019 – win 64, release

window10 64bit, visual studio 2019 – x64, debug

**2. [요구사항]**

(a) 다음 왼쪽 그림의 9개의 물체 중 5개를 선택한 후, 각 물체에 대하여 서로 다른 창의적인 동적 효과를 생성할 것. (각 물체당 최대 15점 (최대 총 75점))

1) 사용한 물체: 

- 부여한 창의적인 동적 효과:

자동차 3대를 만들어, x축방향으로 왔다갔다 하는 운동을 하게 합니다. 초기 속도를 지정하여 중심점에 도달한 순간부터 반대 방향으로 가속도를 받아 점차 속도가 느려지다가 다시 반대쪽으로 움직이는 운동을 하는 자동차들을 만듭니다.

- 확인 방법: 마우스 클릭

2) 사용한 물체: ![텍스트이(가) 표시된 사진

자동 생성된 설명](data:image/tiff;base64,TU0AKgAAQjRoEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf+ENy3/hDct/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf+9gCT/2qUg/9qlIP/apSD/oVso/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/oVso/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/4Q3Lf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/6FbKP/apSD/2qUg/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/5OIGP9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/2qUg/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/9qlIP/apSD/v/8A/6nEDP9oEjH/aBIx/2gSMf9oEjH/iUZW/4lGVv9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf+9gCT/2qUg/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/9qlIP/G6Aj/v/8A/7//AP+0vD3/yq2f/+vhxP/r4cT/sLix/xo0aP9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/72AJP/apSD/2qUg/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/2gSMf+TiBj/v/8A/7//AP/V8GL/6+HE/+vhxP/r4cT/AD96/wA/ev80KFX/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/hDct/9qlIP/apSD/2qUg/9qlIP/apSD/2qUg/9qlIP+hWyj/aBIx/2gSMf+TiBj/v/8A/7//AP+//wD/1fBi/+vhxP87Z4z/AD96/wA/ev80KFX/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oEjH/aBIx/2gSMf9oE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- 부여한 창의적인 동적 효과:

칵테일을 x축과 y축 방향으로 일정한 속도로 나아가다가, 특정한 벽에 도달하면 그와 반대 방향으로 움직이는 운동을 합니다. 이게 계속 지속 되면 궤도는 항상 일정하지는 않지만, 특정한 모양으로 돌며 불규칙적으로 운동을 합니다. 칵테일을 만드는 과정에 착안하게 만들었습니다.

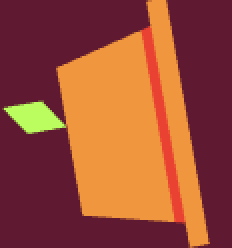
- 확인 방법: 마우스 클릭

3) 사용한 물체: 

- 부여한 창의적인 동적 효과:

위의 칵테일과 같이 x축과 y축 방향으로 일정한 속도로 나아가다, 특정한 벽에 도달하면 그와 반대로 움직이는 운동을 합니다. 이게 계속 되면서 모양을 만들며 불규칙적으로 운동합니다.

- 확인 방법: 마우스 클릭

4) 사용한 물체: 

- 부여한 창의적인 동적 효과:

(+y)방향으로 처음 속도를 가지며 움직이고, 그와 반대로는 중력과 같은 가속을 받아 점점 느려지며 나중에는 수직강하 합니다. 특정하게 만들어준 바닥에 닿으면 다시 튀어 오르며, 이와 같은 탄성운동을 하여 중력 받는 물체처럼 운동합니다.

- 확인 방법: 마우스 클릭

5) 사용한 물체: 

- 부여한 창의적인 동적 효과:

위의 자동차와는 다르게 자동차를 20\*(TO\_RADIAN)만큼 회전시킨 상태로 움직입니다. 이도 위와 같이 3대를 만들어 x축으로 왔다갔다 진동운동을 하며 중심에 도달하는 순간 반대방향으로 가속도를 받아 속도가 느려지다가 반대로 움직이는 형태로 운동을 합니다.

- 확인 방법: 마우스 클릭

6) 사용한 물체: 

- 부여한 창의적인 동적 효과:

중력을 받아 일정한 속도로 원점에서부터 밑으로 하강합니다. 크기는 원래의 크기보다 0.5배 크게 하였습니다.

- 확인 방법: 마우스 클릭

(b) 충분히 복잡도가 있는 2차원 기하 물체를 자신이 한 개 모델링 한 후, 위의 물체들처럼 창의적인 동적 효과를 생성하라. (최대 총 25점)



- 부여한 창의적인 동적 효과:

이 물체는 위의 자동차와 같이 3개를 만들어 똑같은 가속도 운동을 합니다. X축으로 운동하며 중심에 도달하는 순간 반대방향으로 가속도를 받아 속도가 느려지다가 결국엔 속도의 부호가 바뀌면 반대로 움직이는 형태의 운동을 합니다. 크기는 3배로 해주었습니다.

- 확인 방법: 마우스 클릭

(c) 제출한 숙제 중 가장 재미있고 복잡도가 있는 기하 변환 및 애니메이션 효과를 생성한 학생을 적절히 선정하여 최대 25점까지 추가 점수를 부여할 수 있음 (정확한 숫자는 상황에 따라 유동적임). 공정을 기하기 위하여 컴퓨터그래픽스 연구실 대학원생들이 공동으로 심사함.

- 추가 점수를 부여 받아야할 이유   
(복잡한 기하 변환과 재미있는 애니메이션 효과 사용과 확인 방법 등을 서술)

처음 실행화면을 첨부합니다.

