EpicSam: BatteriesNotIncluded2 Project plan - Deliverable 2

Haorui Li, Darius Bruno, Kevin Wei, Ilyas Naim

Task breakdown & assignment

Tasks: implement 4 mini simulations that encompass the 4 main topics of the NYA mechanics course: momentum, forces, energy and kinematics.

User story: I want to visually observe the concepts I've learned in the mechanics course and see the effects of momentum, forces energy and kinematics in the real world.

To be implemented:

- Momentum: a simulation where the user can control objects that collide into each other and be able to observe the energy transfer. Assigned to Haorui
- Forces: a simulation where the user can apply forces of various magnitudes and directions on an object and see the net force on it. Assigned to Darius
- Projectile motion / kinematics: a simulation where the user can project motion of tiles thrown through the air. Assigned to Kevin.
- Energy: a simulation where the user can interact with a test dummy on a skateboard in order to visualize the energy levels. Assigned to Ilyas.

Task breakdown & assignment

Tasks: implement 4 mini simulations that encompass the 4 main topics of the NYA mechanics course: momentum, forces, energy and kinematics.

	User story	To be implemented	Assigned to	Estimated duration
Momentum	As a physics student, I want to observe how momentum is transferred in collisions, so that I can understand momentum visually.	A simulation where the user can control objects that collide into each other and be able to observe the energy transfer	Haorui	~9 weeks
Kinematics	As a physics student, I want an interactive kinematics simulation, so that I can understand motion concepts such as displacement, velocity, etc visually.	A simulation where the user can control an object into projectile motion or in 1D motion by changing parameters such velocity, acceleration, etc.	Kevin	~9 weeks
Energy	As a physics student, I want an interactive energy simulation, so that I can understand energy concepts such as energy transfers visually.	A simulation where the user can interact with a test dummy on a skateboard, as well as different parameters that have an impact on the energy levels, in order to visualize energy transfers.	Ilyas	~9 weeks
Forces	As a physics student, I want an interactive forces simulation, so that I can understand how different forces affect an object visually.	A simulation where the user can apply various forces to an object and see the results	Darius	~9 weeks

Class diagram
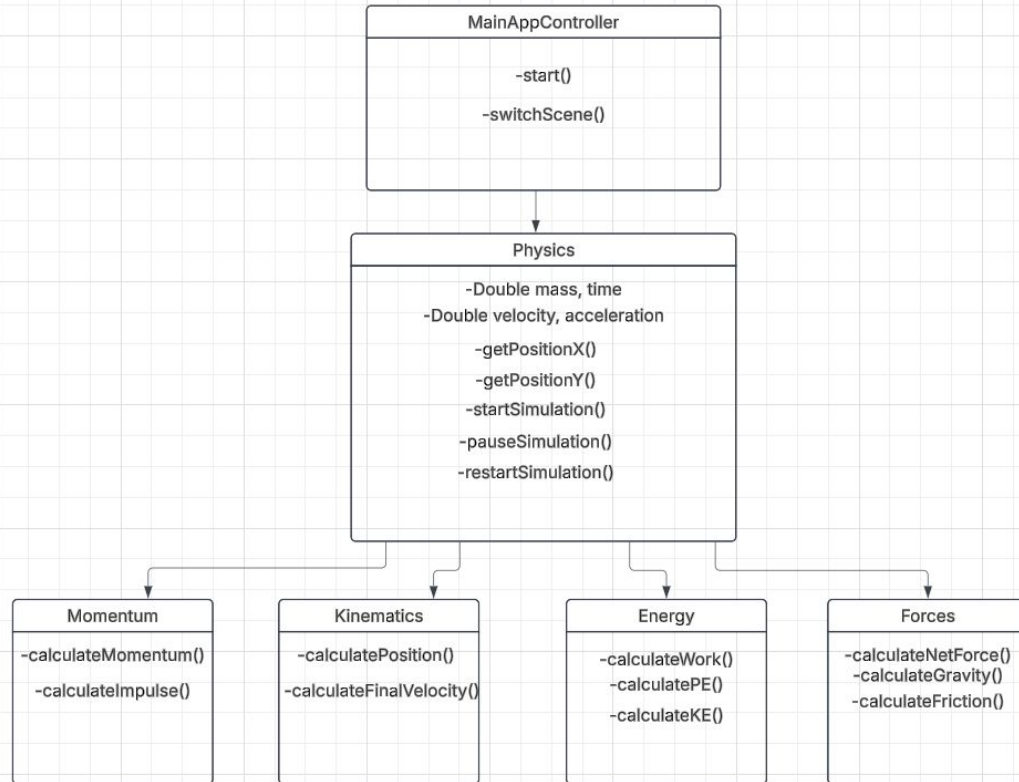
Sample input & output

Momentum:

- Input: user chooses the mass and number of balls, sets their angles, velocities and presses play.
- Output: the balls get launched and collide, transferring momentum, with the energy transfer, positions, change in velocity all displayed to the user.
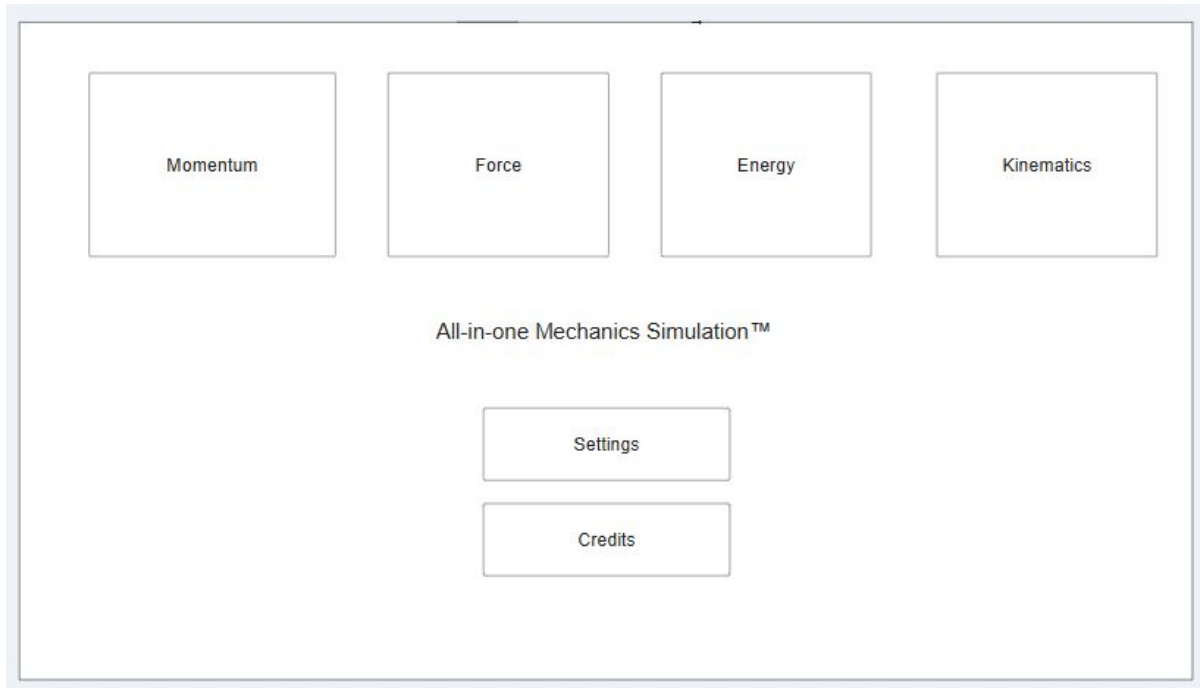
Forces

Projectile motion / kinematics

Energy:

- Input: User chooses the friction (0-50 N), gravity (0-20 m/s^2), mass (0-100 kg), and function path (mathematically), in order to observe energy levels and transfers. The user can also choose to display the speed and/or the energy pie chart.
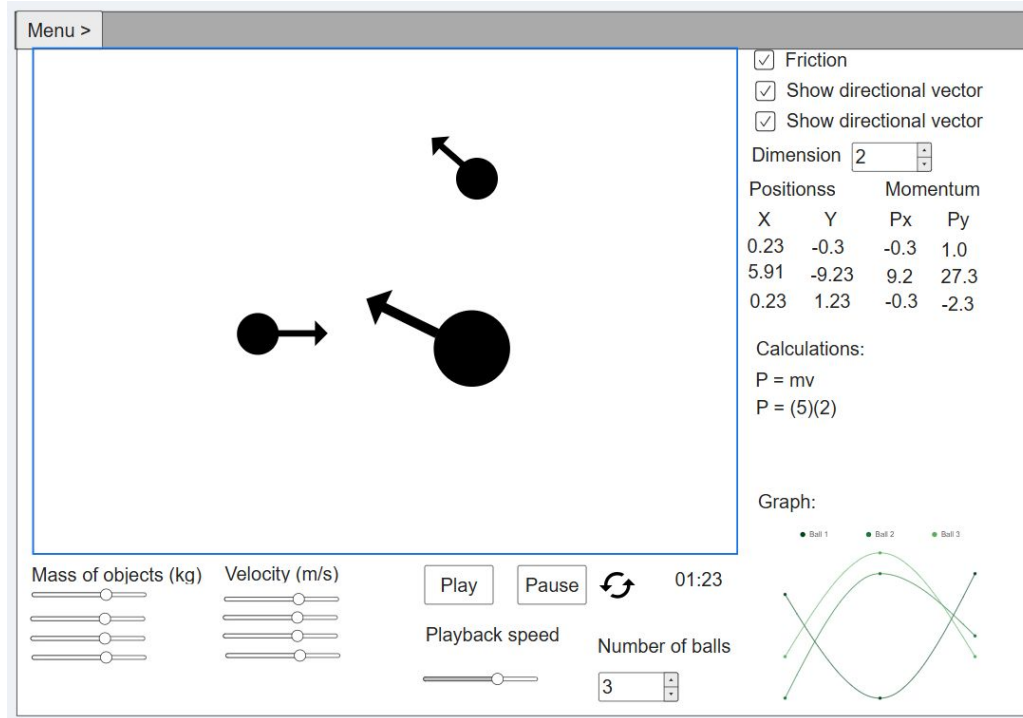- Output: Skateboard movement, function path (graphically), speed, time, energy transfers.
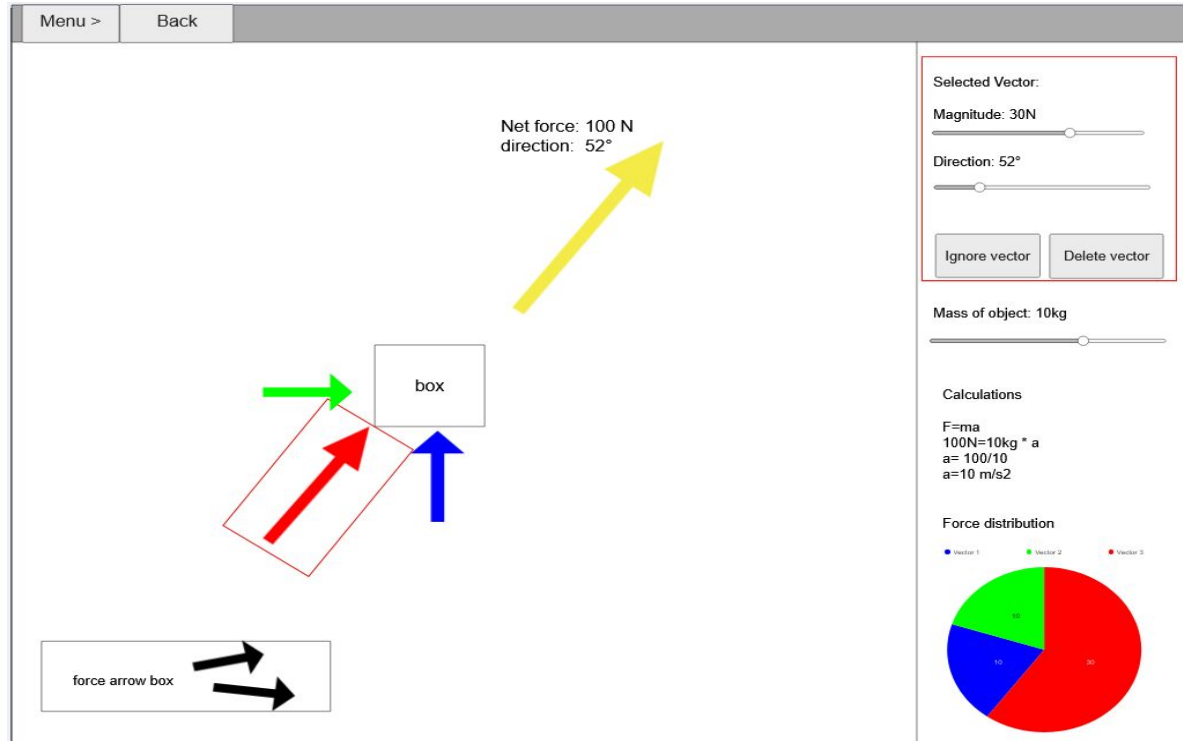
Wireframe

Homescreen

Wireframe (continued)

Momentum simulation

Menu >

☑ Friction
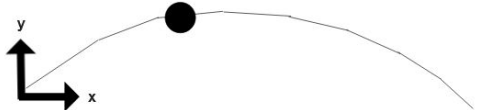☑ Show directional vector
☑ Show directional vector

Dimension 2

Positionss		Momentum	
X	Y	Px	Py
0.23	-0.3	-0.3	1.0
5.91	-9.23	9.2	27.3
0.23	1.23	-0.3	-2.3

Calculations:

$P = mv$

$P = (5)(2)$

Graph:

• Ball 1   • Ball 2   • Ball 3

Mass of objects (kg)   Velocity (m/s)

Play   Pause   01:23

Playback speed

Number of balls

3

Wireframe (continued)

Forces simulation

Wireframe (continued)
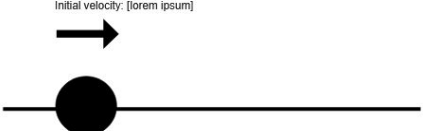
Kinematics

Wireframe (continued)

Energy
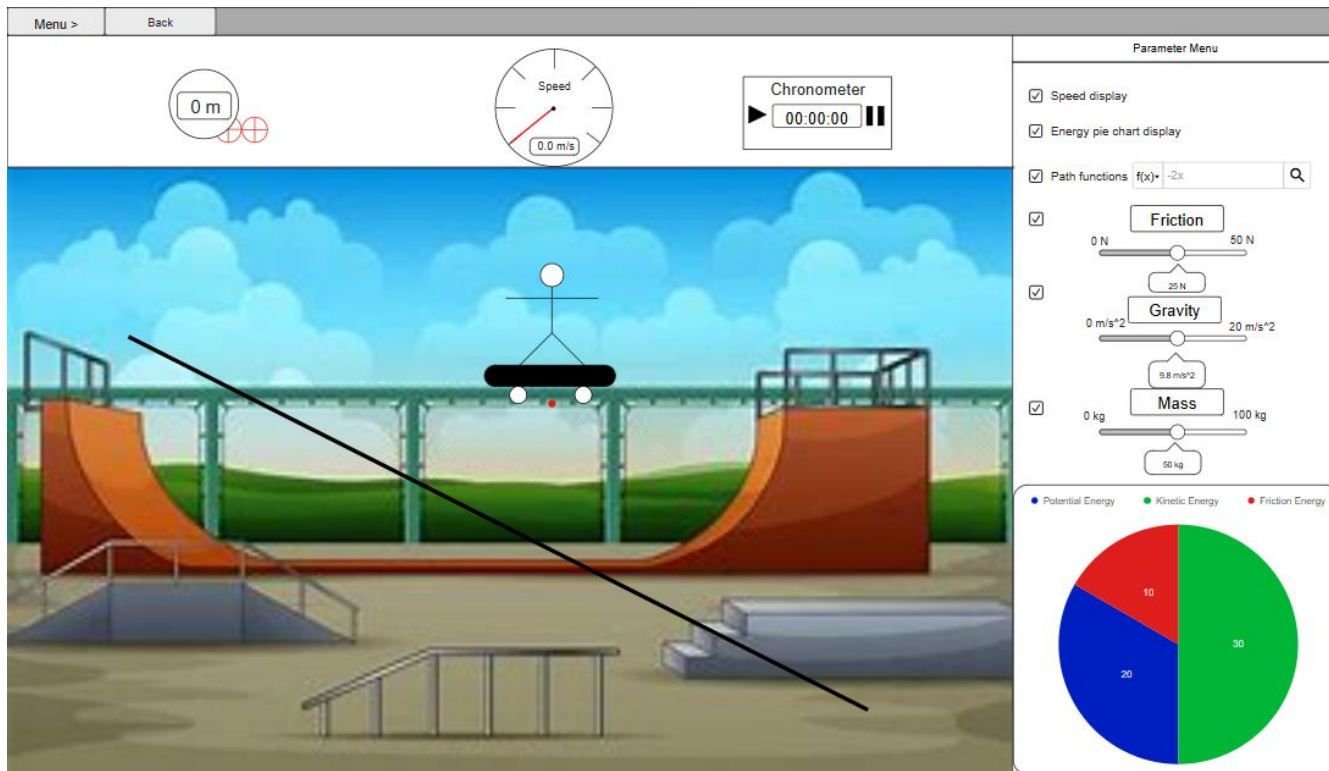
Sprint report

Team summary report

Received stories	Resolved stories	Carry over stories	Blocked stories
[W25-8] Decide on what we are doing (1)	[W25-8] Decide on what we are doing (1)		
Total points: 1	Total points: 1	Total points:	Total points:

Sprint report

Haorui

Received stories	Resolved stories	Carry over stories	Blocked stories
[W25-22] Momentum UI (5)	-	-	-
[W25-11] Momentum animation (8)	-	-	-
[W25-34] Momentum logic (8)	-	-	-
Total points: 21	Total points:	Total points:	Total points:

Sprint report

Kevin

Received stories	Resolved stories	Carry over stories	Blocked stories
[W25-21] Projectile UI (5)			
[W25-28] Kinematics UI (5)			
[W25-9] Physics Java class (5)			
Total points: 15	Total points:	Total points:	Total points:

Sprint report

Ilyes

Received stories	Resolved stories	Carry over stories	Blocked stories
[W25-24] Energy UI (5)			
[W25-13] Energy animation (8)			
[W25-36] Energy logic (8)			
Total points: 21	Total points:	Total points:	Total points:

Sprint report

Darius

Received stories	Resolved stories	Carry over stories	Blocked stories
[W25-12] Forces Animation (8)			
[W25-37] Forces logic (8)			
[W25-23] Forces UI (5)			
Total points: 21	Total points:	Total points:	Total points:

Sprint report

KanBan board part 1

Integrative Project Progress

Start stand-up

🔍 Search | Label ⌄

GROUP BY None | Insights | View settings

OPTIONAL FEATURES 6

(5) keybinds
UI/UX
☑ W25-16

(8) Add an intro animation to the app
UI/UX
☑ W25-17

(3) Ask for tips after user exits a simulation
horribleIdea(funny)
☑ W25-18

(3) Ads
horribleIdea(funny)
☑ W25-19

(3) Login UI
UI/UX
☑ W25-20

(8) Login Database
☑ W25-26

TO DO 12

(8) Projectile Animation
animation
☑ W25-10

(5) Kinematics Animation ⋯
animation
☑ W25-27

(8) Momentum Animation
animation
☑ W25-11

(8) Forces Animation
animation
☑ W25-12

(8) Energy Animation
animation
☑ W25-13

(3) Main Menu functionality
☑ W25-29

(8) Menu Bar Functionality
☑ W25-32

IN PROGRESS 8

(5) Projectile UI
UI/UX
☑ W25-21

(5) Energy UI
UI/UX
☑ W25-24

(5) Momentum UI
UI/UX
☑ W25-22

(5) Kinematics UI
UI/UX
☑ W25-28

(5) Forces UI
UI/UX
☑ W25-23

(3) Main Menu UI
UI/UX
☑ W25-25

(5) Menu Bar UI

NEED TESTING/IN TESTING

BUGS 1

procrastinating
Random
☑ W25-33

DONE 2 ✓

(1) Decide what exactly we doing
☑ W25-8

(0) Why is it called free robux working 2025 no survey
Random
☑ W25-7

Sprint report

KanBan board part 2

Integrative Project Progress

Start stand-up

Search Label GROUP BY None Insights View settings

OPTIONAL FEATURES 6	TO DO 12	IN PROGRESS 8	NEED TESTING/IN TESTING	BUGS 1	DONE 2 ✓

OPTIONAL FEATURES 6

W25-20

(8) Login Database
W25-26

TO DO 12

(3) Main Menu functionality
W25-29

(8) Menu Bar Functionality
W25-32

(3) Make everything look nice
teamEffort
W25-30

(8) Momentum logic
W25-34

(8) Kinematics logic
W25-35

(8) Energy logic
W25-36

(8) Forces logic
W25-37

+ Create issue

IN PROGRESS 8

(3) Main Menu UI
UI/UX
W25-25

(5) Menu Bar UI
UI/UX   teamEffort
W25-15

(5) Physics Java Class
W25-9

Thank you