



EpicSam: BatteriesNotIncluded2

Project plan - Deliverable 2

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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:

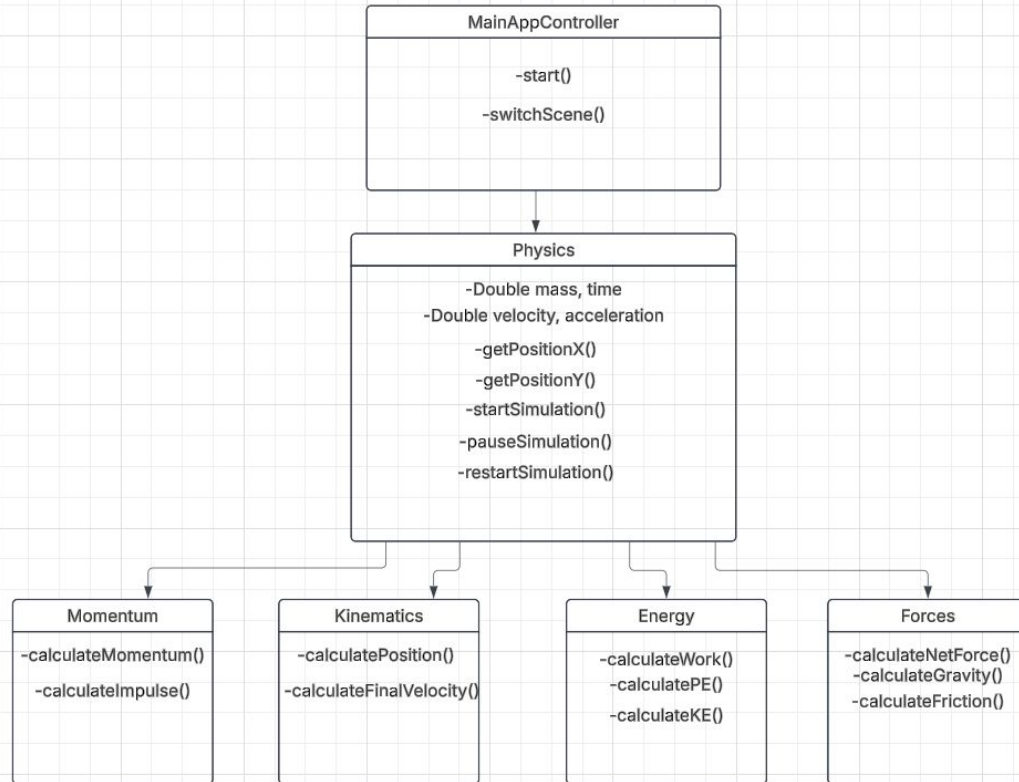
- Momentum: a simulation where the user can control objects that collide into each other and be able to observe the energy transfer. Assigned to Haorui
- Forces: a simulation where the user can apply forces of various magnitudes and directions on an object and see the net force on it. Assigned to Darius
- 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:

- Input: the user adds a number of force vectors to the diagram and sets their magnitude and direction.
- Output: the net force on the object is displayed as a vector along with a force distribution diagram

Projectile motion / kinematics:

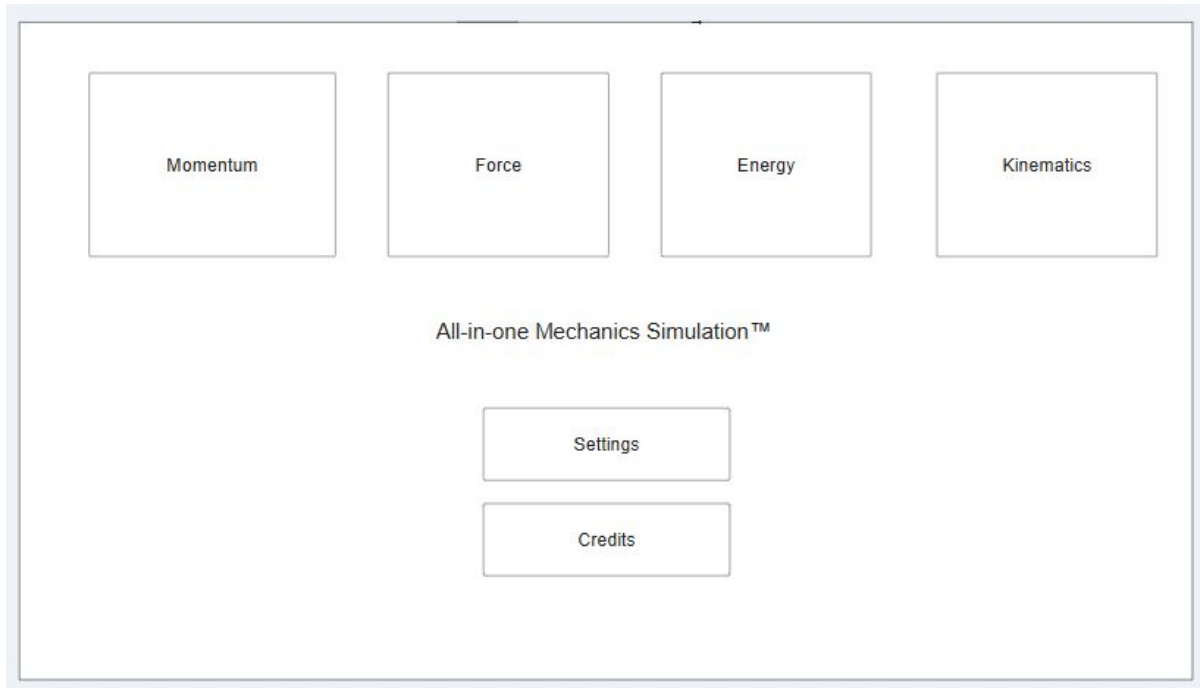
- Input: the user chooses the mass, initial velocity, gravity, and angle of launch of the ball and presses play
- Output: the ball launches through the air and displays the balls trajectory with calculations.

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.

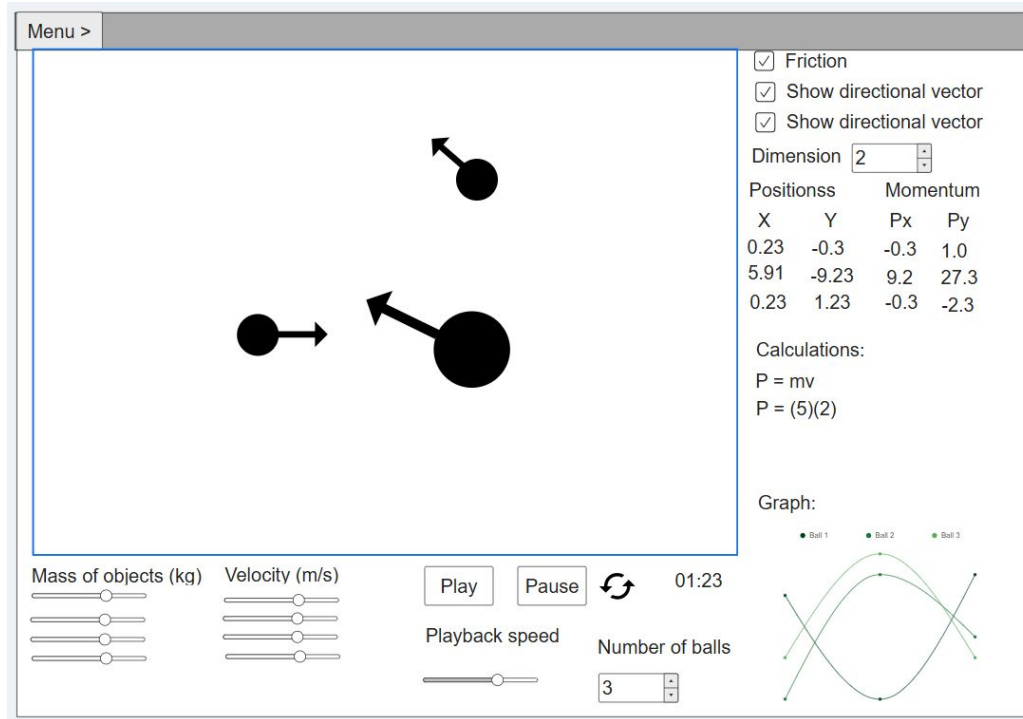
Wireframe

Homescreen



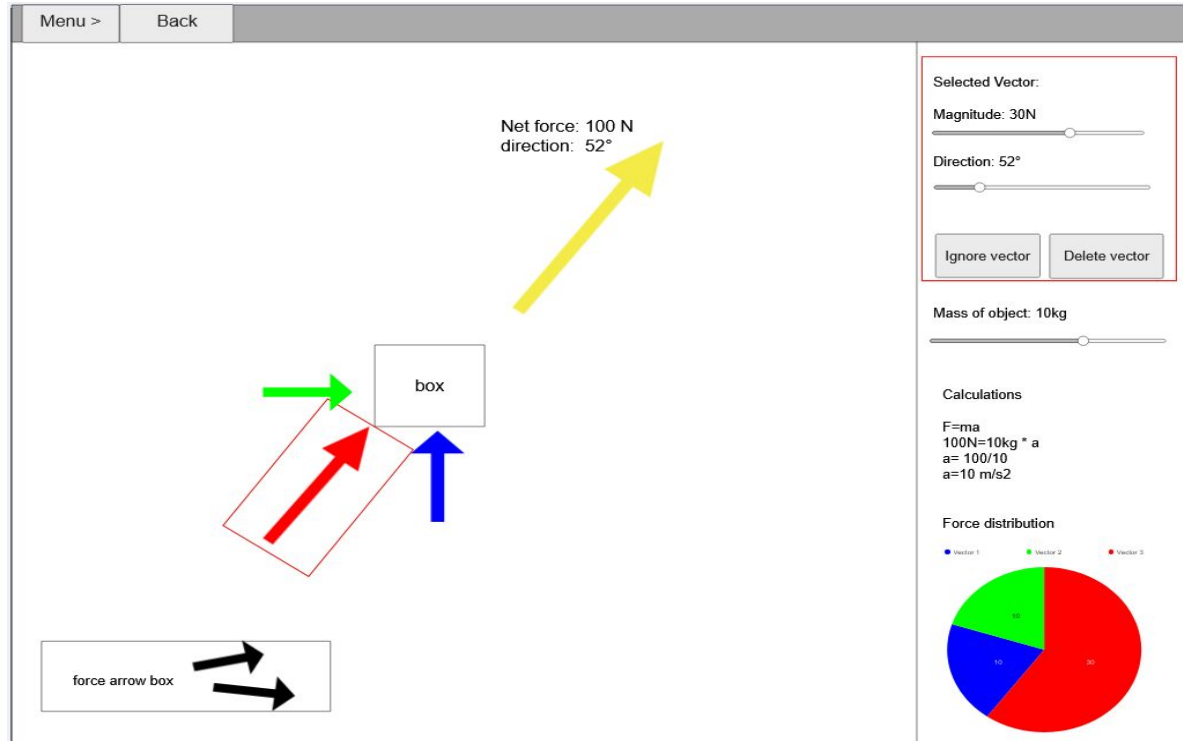
Wireframe (continued)

Momentum simulation



Wireframe (continued)

Forces simulation

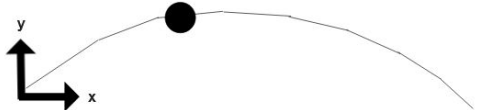


Wireframe (continued)

Kinematics

Menu >

Back



☒ Projectile motion

☐ 1D kinematics

Parameter Menu

Angle of launch (degrees)

0

89

Height of launch (m)

0

100

Initial velocity (m/s)

0

100

Gravitational Acceleration (m/s²)

0

25

Play

Stop

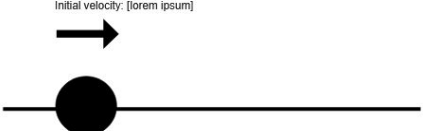
Clear

Calculated results:

Object travelled a distance of 10 m in 3 seconds.
Max height reached by object is 20 m.

Menu >

Back



☐ Projectile motion

☒ 1D kinematics

Parameter Menu

Initial velocity (m/s)

0

100

Initial position (m)

0

100

Acceleration (m/s²)

0

100

Play

Stop

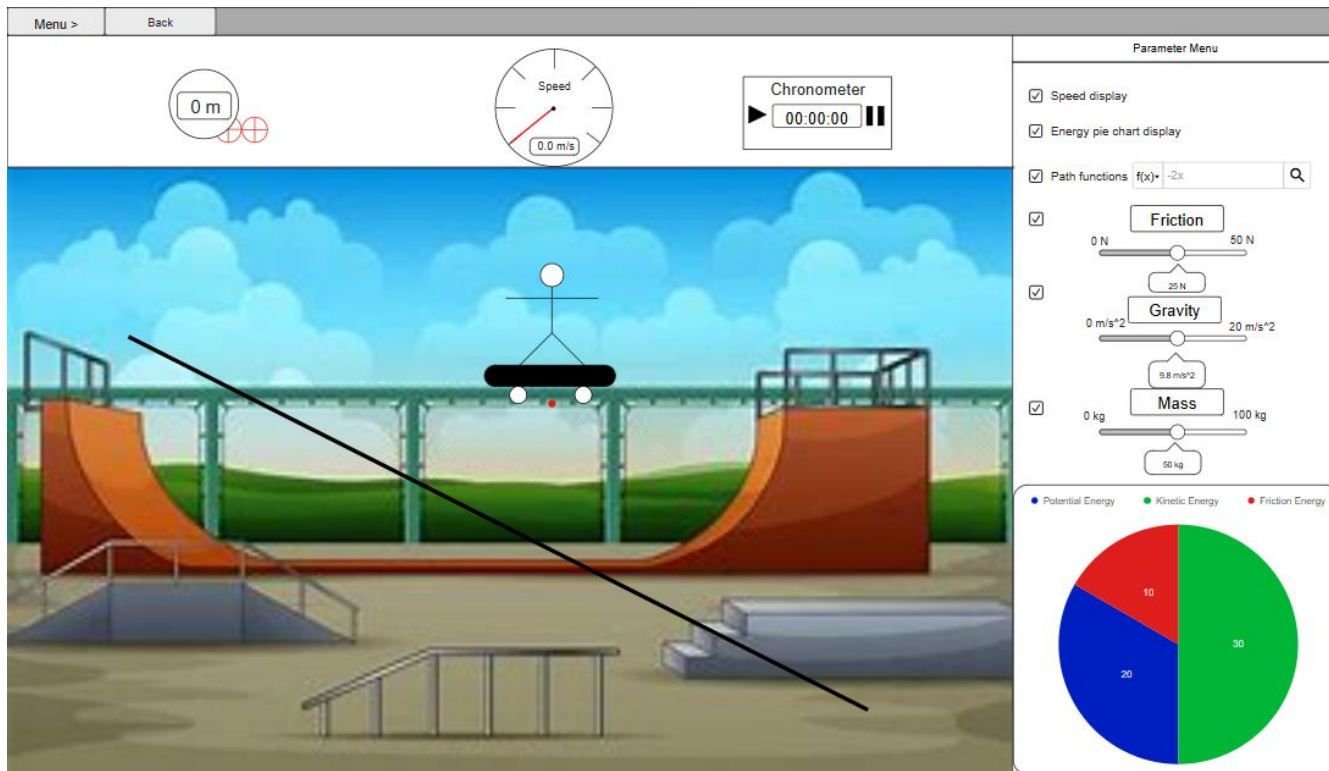
Clear

Calculated results:

Object travelled a distance of 10 m in 5 seconds.
Final velocity is 4 m/s

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

Projects / FreeRobuxWorking2025NoSurvey

Integrative Project Progress

⚡ ☆ 🔄 ↗ Start stand-up ...

Q Search

DB HL IN ... Label ▾

GROUP BY None ▾ Insights View settings

OPTIONAL FEATURES 6

(5) keybinds

UI/UX

✓ W25-16

DB

(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

HL

(8) Forces Animation animation

✓ W25-12

DB

(8) Energy Animation animation

✓ W25-13

IN

(3) Main Menu functionality

✓ W25-29

DB

(8) Menu Bar Functionality

✓ W25-32

DB

IN PROGRESS 8

(5) Projectile UI UI/UX

✓ W25-21

...

(5) Energy UI UI/UX

✓ W25-24

IN

(5) Momentum UI UI/UX

✓ W25-22

HL

(5) Kinematics UI UI/UX

✓ W25-28

...

(5) Forces UI UI/UX

✓ W25-23

DB

(3) Main Menu UI UI/UX

✓ W25-25

DB

(5) Menu Bar UI

NEED TESTING/IN TESTING

BUGS 1

procrastinating

Random

✓ W25-33

...

DONE 2 ✓

(1) Decide what exactly we're doing

✓ W25-8

(0) Why is it called free robux working 2025 no survey

Random

✓ W25-7

Sprint report

KanBan board part 2

Projects / FreeRobuxWorking2025NoSurvey

Integrative Project Progress

⚡ ☆ 🔗 🗨 Start stand-up ⋮

🔍 Search

👤 DB HL IN 👤 Label ▾

GROUP BY None ▾ Insights View settings

OPTIONAL FEATURES 6

- ✓ W25-20 👤
- (8) Login Database
- ✓ W25-26 👤

TO DO 12

- (3) Main Menu functionality
 - ✓ W25-29 DB
- (8) Menu Bar Functionality
 - ✓ W25-32 DB
- (3) Make everything look nice
 - teamEffort
 - ✓ W25-30 👤
- (8) Momentum logic
 - ✓ W25-34 HL
- (8) Kinematics logic
 - ✓ W25-35 👤
- (8) Energy logic
 - ✓ W25-36 IN
- (8) Forces logic
 - ✓ W25-37 DB
- + Create issue

IN PROGRESS 8

- (3) Main Menu UI
 - UI/UX
 - ✓ W25-25 DB
- (5) Menu Bar UI
 - UI/UX teamEffort
 - ✓ W25-15 👤
- (5) Physics Java Class
 - ✓ W25-9 👤

NEED TESTING/IN TESTING

BUGS 1

DONE 2 ✓



Thank you