MARK 03 - MAGNETIC RAILS

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▼ PROJECT CONCEPT

▼ PLAYER CONTROL

- Player avatar: the player controls a train
- Game type: endless running
- General enviroment: the game takes place along a cylindrical shaped magnetic rail

▼ LORE

▼ CORE GAMEPLAY

- During the game, obstacles and enemies appears along the rail
- The goal of the game is to drive the train as long as possible without letting it be destroyed

- The player can use the arrow commands to turns around, accelerates or slows down the train along the train rail
- The game will end when the train loses all its health bar and is destroyed

▼ GAMEPLAY MECHANICS

▼ CONTROL INPUTS

- Lateral move:
- Accelerate:
- Slows Down:
- Gear shift:
- Escolher power-up:
- Usar power-up:
- Pausar:

▼ SOUNDS

- Train moving sound
- Train colliding sound
- Sound of train being hit by enemy projectiles
- Sound of the train being destroyed

▼ USER INTERFACE

- Health bar
- Travelled distance (core)
- Energy bar
- Power-ups

▼ EFFECTS

- Particle effects when colliding with enemies or obstacles
- Particle effects when taking damage from enemy projectiles

▼ OTHER FEATURES

- This section deals with mechanics included in MVP but not detailed elsewhere in this GDD

▼ GEAR SHIFT

- The player can shift the train's gears to modify how the train reacts to player inputs
- Lower gears make the train more controllable but slow down the manoeuvres
- Higher gears make the train move faster, but make it harder to control.
- Mechanics similar to the ships in the R-Type Delta game

▼ The amount of gears:

- There would probably be 3 gears in the game
- The default gear would be the middle gear
- The player would then decide to switch to slower or faster gears any time they want.

▼ BACK LOG (BEYOND MVP)

▼ POWER-UP MECHANIC

- Power-ups are collectibles that can be acquired along the rail

▼ POSSIBLE POWER-UPS

▼ FLEXIBLE JOINTS

Makes train cars able to reconnect after a collision. User needs to click action button quickly for them to reconnect. This ability has a cooldown, which is the time for the wagon's joints to recover from the impact.

▼ MAGNETIC RIOT

- Skill in which the train fires an energy discharge at the train track destroying hazards up to a certain distance ahead
- The disturbance would affect the entire three-dimensional surface of the rail

▼ GHOST TRAIN

- The train enters an ethereal form and becomes intangible to dangers

▼ STEALTH TRAIN

- The train manages to get inside the track and hide there for a certain time
- During that time in hiding could he do certain things?
- This ability causes a secret compartment to appear on the rail's surface, which can be used to access the inner part of the rail

▼ SHIELD

▼ POLARITY CONTROL

- The train can now control the polarity of magnetism
- With this power-up he can make him be repelled by the rail and somehow fly over the scenery
- Repulsion must be used with caution as if the train strays too far from the track it loses the ability to return, causing a game over.

▼ MYSTICAL RAIL

- This power-up causes a ramp to appear on the track
- When passing through the ramp, the train performs a jump
- A special surface appears to aid the return to the original rail
- The aid surface grows to the locations where the player orders the train to move

▼ SKILLS MECHANIC

▼ LASER BEAM

- The train is equipped with a laser beam that can be used to destroy obstacles and enemies
- Using the laser beam depletes the train's energy bar

▼ SPEED BURST

- The train whistles and accelerates quickly and even surpassing its speed barrier
- Spends energy to be used
- The sudden increase in speed can be useful for reaching the high speeds needed to interact with certain features in the environment.

▼ ENERGY BAR MECHANIC (?)

- An energy bar can be added to the train, so that it can use:
  - Option 1: certain skills (likely chosen option)
    - The energy bar is used for certains skills (laser beam, speed-up), and power-ups becomes part of another mechanic
    - In this case, each power-up could be used one single time, while the train skills could be used anytime, as long as it has enough energy
  - Option 2: use the power-ups
    - In this case, the player collects power-ups along the rail and chooses which one he wants (maximum 3, for example). Using these power-ups would deplete the energy bar

▼ TELEPORT PORTALS

- The train can enter certain portals and teleport
- Certain portals can only be accessed at certain speeds

▼ Where would these portals lead? (under development)

- bonus areas?
- shop?
- stage shift?
- byway?

▼ TERRAIN CHANGES

- The surface on which the train travels can change and bring different effects to the gameplay
- Effects examples: acceleration, deceleration, damage, healing, energy recharge

▼ BOSSES

- Bosses could under the occurrence of certain conditions
- Bosses would drop unique power-ups
- Bosses would have more elaborate mechanics
- During a boss fight the train could enter on a megazord form, or receive the help from allied trains

▼ SHOP

- It could be a time to slow down the gameplay and give the player a rest
  - The store could offer products like recovery, passive skills and upgrades

▼ This location could be accessed in any of these ways:

- A portal that can appear at certain moments of gameplay
- While using the stealth train power-up. This is a moment when the train can stop, as it is not visible to enemies
- Through a specific store activation power-up
- Appearance of a fork in the trail

▼ BIFURCAÇÕES NOS TRILHOS CILÍNDRICOS

▼ BONUS AREA/DIMENSION

- A place similar to Donkey Kong or Préhistorik man
- It is an area dedicated to the collection of resources

▼ DIFFERENT TRAINS

- The game could offer to buy or enable the use of new trains
- It could also allow to swap parts of the train in order to create a build

▼ SKETCHS

▼ DESIGN REFERENCES

- Crash Nitro Kart
- Préhistorik man
- R-Type Delta
- Gokujou Parodius
- Biker mice from mars
- Jetpack joyrider

▼ PLANNED TIMELINE (4 months)

1. Until april/03: project setup, camera setup and implementation of the rail moviment and basics train control mechanics, with primitive objects
2. Until april/05: anchoring cars to the train's locomotive and making this system physically coherent
3. Until april/15: implementation of random rail generation
4. Until april/25: implementation of player control of the train, including the gearshift system
5. Until may/01: obstacles and enemies spwaning randomly and implementation of the collisions with these objects
6. Until may/08: replacing primitive objects with real 3D assets

7. Until may/15: implementation of healing and game over mechanics, but not added to UI
8. Until may/30: implementation of particle and sound effects
9. Until august/01: correctios and backlog

▼ QUALITY ASSURANCE

Bug report tracking
Bug tracking and resolution is a vital part of polishing the product for delivery. The tools used to track bug reports vary — Jira and Github are popular choices, but many individuals and teams use a spreadsheet.

Typical bug reports include:

- **Title / brief summary:** A descriptive title for the bug.
- **Identified frequency**: How often does this bug occur (every time, most times, randomly, rarely)?
- **Reproduction steps**: Precise steps on how to reproduce the bug. This should be detailed enough that a developer can recreate the bug themselves without any additional information.
- **Detailed description:** A more detailed summary of the bug and its impact on user experience.
- **Any other observations**: These could include thoughts on what may be causing the bug and other relevant details (for example, “error occurs inconsistently, but more frequently at night than during the day”).

▼ DEV LOG

- 31/03/2023: confection of gdd

▼ 03/04/2023: project setup and basic mechanics implementations

- ✅ Project created: ok
- ✅ Camera setup: ok

- ▼ ☑️ Train movement: partially ok, needs to be refined
  - The train is moving along and around the rails, but the movement is unnatural.
  - At the moment, a translation is being applied to the train
  - Ideally a force should be applied to its base or its center, to correct the issues during the moviment
- ▼ ☑️ Magnetic force: partially ok, needs to be refined
  - To keep the train connected to the tracks even upside down, a force that always points downwards has been applied to the train
  - This is working, but ideally the track would attract or repel the train and obstacles
  - At times, the train disconnects from the track and is unable to return.
- ▼ ☑️ Rail building:
  - Straight rails: initially, a primitive rail was made in a straight line to test mechanics of movement and rotation around the rail.
  - Straight rail builder: an abstract GameObject was created to manage the build. Initially it is only able to build rails in a straight line.
  - Bézier curves: ProBuilder's Bézier curve tool was used to create curved rails in different shapes. Currently, this type of rail is only being created manually. In the future, it will be necessary for the builder to create these rails automatically according to certain parameters
  - Next step: create various types of rail prefrabs and have the builder use them to create different rails
- ▼ ☑️ Obstacles:
  - Predetermined obstacles: Obstacles were placed manually along the track. These obstacles manage to get stuck to the rail
  - Next steps:
    - randonic obstacles spawn

        - randonic position spawn

- ▼ 06/04/2023: train implementation of several cars + backlog refinement
    - ▼ ✅ Anchoring wagons: ok, needs refinements but not much
        - the locomotive is now pulling wagons
    - ▼ ☑️ Train movement: partially ok, needs to be refined
        - the train is moving using a force, not a direct translation anymore
        - is also braking
        - however, it is still making curves using translations
        - it was tested to make curves by applying a force, but it was also not physically consistent. Obs.: the force was being applied at the center of the train
        - this needs to be tested by applying a torque, using the center of the rail as the axis of rotation
        - the application of force at the base of the train, close to the point of contact with the rail, could also be tested
    - ▼ ☑️ Magnetic force: partially ok, needs to be refined
        - a collider was added to the rail to attract objects that entered it, thus simulating the action of the magnetic field
        - however, the physics of this field simulation needs to be refined as it is still not responding well.
        - the field is really attracting the objects, however, the train ends up overturning when tries to make curves
    - ▼ ☑️ Rail building:
        - there has been no progress on this topic
        - Next step: create various types of rail prefrabs and have the builder use them to create different rails
    - ▼ ☑️ Obstacles:
        - there has been no progress on this topic

- Next steps:
    - randonic obstacles spawn
    - randonic position spawn

▼ 09/04/2023: backlog refinements