BotArena

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About

BotArena is gaming project on the **Cardano** blockchain, with an initial collection of **10.000 NFTs**.

Each NFT represents a **bot** composed by 5 different parts (head, body, legs, two weapons).
Collect, **build** your team and **battle**!
Every bot is **unique**, each part combination gives different abilities, stats and attacks.

- Unique **turn based** battle system
- Design your perfect **team**
- Every **battle** is different
- Choose your **strategy**

Disclaimer:

Please note, the plans described here are subject to change as we are still in the early stage of development.

We are looking forward to getting your **feedbacks** and **suggestions**!

Project Scope

The main goal of this project is to create a fun and **engaging game**, with lots of **strategies** and challenges.

We expect a very active **secondary market**, with players **trading** and searching for the perfect bot to add to their **team**.

In addition to the game we want to provide a rich **connected ecosystem** by adding further **functionalities** to the game.

Functionalities such as **disassembling bots** in their constituent parts and reassembling them in different configurations, by spending **native tokens**.
We are currently studying how to best implement the future game **tokenomics**.

While the initial iteration of the game consists in battles between two teams of three bots, we want to eventually provide **alternative game modes,** such as bigger (or smaller) battles, battles between multiple teams and best of three/five matches with **bot substitution** (changing team composition between battles will add a new strategy layer to the game).

We aim to create a **decentralized game**, with a rich environment and an engaged community, because of this we will ask and consider **community** feedbacks and suggestions with open arms!

Collection

The collection is made of **10.000 unique bots**, each of them is built from 5 different parts (head, body, legs, two weapons).

There are 15 different available heads, 15 different bodies, 15 different bodies and 30 different weapons. Each of them with its **unique set of stats, abilities and attacks**.

Acid Launcher
Part: Body
Rarity: Common

HP: 5 | Armor: 0 | Size: 6
attack : {cd: 3, dmg: 1, hits: 2, type: 'acid'}

Berserker Suit
Part: Body
Rarity: Rare

HP: 4 | Armor: 0 | Size: 3
all cd: -1, speed: +1, menace: +1

Shield
Part: Weapon
Rarity: Common

HP: 6 | Armor: 2 | Size: 4
shield, menace +1, attack: {cd: 2, dmg: 1}

Machine Gun
Part: Weapon
Rarity: Common

HP: 3 | Armor: 0 | Size: 4
attack: {cd: 2, dmg: 1, hits: 3}

Moreover each bot can come in one of 15 **different colors**, collectors would surely want to get their hand on a team of their favourite color!
The total number of possible bots is over **45 millions**, but only 10.000 will be minted.

Rarity

There are **three rarity tiers** for bots parts, each of them rolled **separately** and **independently** at bot creation.
For heads, bodies, and legs there are 7 common parts, 5 uncommon parts and 3 rare parts, while for weapons there are 14 common weapons, 10 uncommon weapons and 6 rare weapons.

- **Common**: 60% chance
- **Uncommon**: 30% chance
- **Rare**: 10% chance

So the probability of getting a bot with exactly one rare part out of five is 32.8%, two rare parts 7.2%, three rare parts 0.8%, four rare parts 0.04% and five rare parts 0.001%. Around 59% of bots will not have any rare parts.

Tracking	Gauss Rifle
Part: Head	Part: Body
Rarity: Rare	Rarity: Rare
HP: 2 | Armor: 0 | Size: 1	HP: 3 | Armor: 0 | Size: 4
starting cd: 0, speed: -1	attack: {cd: 3, dmg: 5, armorpen: 2}

From the gaming perspective rarity is **balanced** in such a way that rare parts are **not necessarily the strongest**.
On the other hand they can open **different strategies** for the team or give some **specific utility** to the bot.
The main objective in deciding parts stats and abilities was to avoid having strictly better parts than others.

A complete list about the available parts, their rarities and their abilities and stats will be released soon.

The Game

Two teams of **three bots** face each other in a **turn based** battle resolved **automatically**. They exchange fierce **attacks**, firing with a vast **gun arsenal** and swinging swords, hammers and other **melee weapons**.

From **machineguns** and **laser** rifles to **chainsaws** and **rocket launchers**, each weapon deals different **damage** values, has a different **firing cooldown** and additional **effects** and properties, such as acid damage, EMP damage, slowing effects and armor piercing damage.
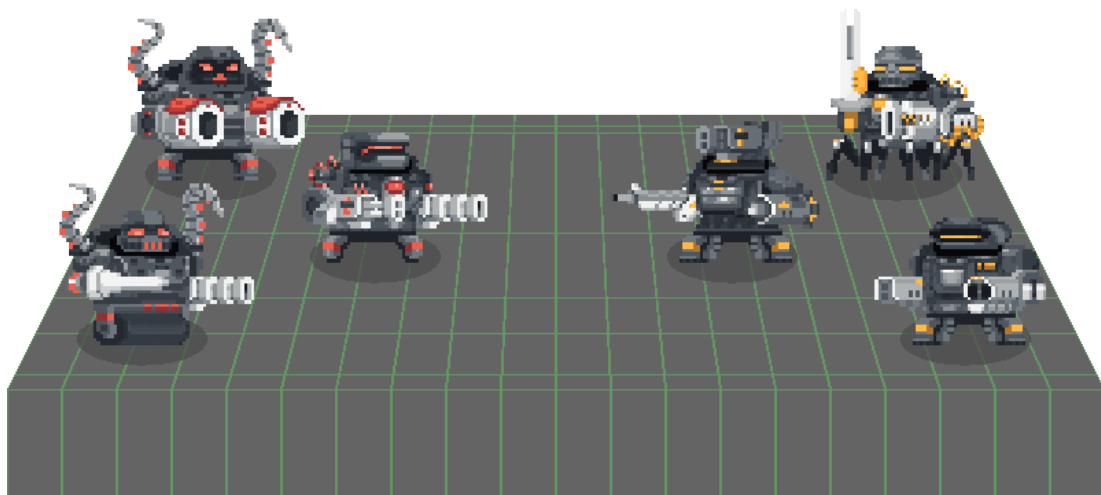
When a bot receives an attack damage is dealt to the **hit part**, too much damage and that part is **destroyed**.
As the battle continues and bots take damage their effectiveness starts to decline, from destroyed weapons to **immobilized bots**.

It is vital to protect the more **fragile bots** with more **armored** tanks who can draw enemy fire and soak damage for their **teammates**.
Your choice of bots to field in the battle will make the difference between a **close victory** or a **valiant defeat**.

Bot Parts

Each bot is composed by **5 parts**, each one of them with different **stats** and **abilities**.
Some of them can grant **special attacks**, others extra **protection** or utility.
Should a part **HP** go to zero it will be **destroyed** for the rest of the battle.

Head: it usually grants special abilities or influences **target choice.**
Should it be destroyed the **targeting** system of the bot will be
compromised, giving it a **longer attack cooldown**

Body: the main and usually biggest part of the bot, when **destroyed** the
bot is KO, it better to be armored!

Legs: the main part deciding the **bot speed**, it follows naturally that if
destroyed the bot speed would be severely impacted
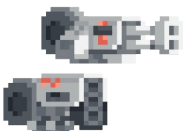
Two weapons : the bot two weapons are its main way of attacking the
enemies, definitively a **high priority target**!

Bot Parts

Every part has always **three fundamental stats**:

- **Hit Points (HP)**: The **durability** of the part, when it reaches zero the part is **destroyed** and can't be used for the rest of the battle

- **Armor (Ar)**: Every hit to the part will have its **damage reduced** by the amount of armor, unless the attack was **armor piercing** or **armor negating**

- **Size (Sz)**: How **big** is the part, the bigger it is, the higher the **probability** it will be **hit** instead of other parts of the bot

In addition to the fundamental stats some part can have other **properties** and **abilities**, such as granting **immunity** to EMP damage, making a bot **faster**, shielding other parts and many more.

Diamond Armor	Quad Legs
Part: Body	Part: Legs
Rarity: Rare	Rarity: Common
HP: 5 | Armor: 1 | Size: 4	HP: 5 | Armor: 1 | Size: 4
emp immune, slow immune	speed: 5

Moreover the **bot legs** have another attribute: "**speed**", which is the **base speed** of the bot, before applying other **modifier** from other parts or from other effects.

Speed attribute is a measure of the bot speed, **faster bots** will **attack before** slower bots.

If the bot speed reaches 0 the bot is considered **immobile** and can't act until its speed rise again over 0.

Attacks

Weapons, and sometimes other parts, make bots able to **attack** enemies.
The two main attributes of every attack are **damage (dmg)**, the amount of damage dealt to the enemy bot **hit part**, and **cooldown (cd)**.

Weapon **cooldown** represents how much **time** it takes to fire the weapon.
Every turn each cooldown **counts down** by one, when the cooldown reaches **zero** the weapon **fires** and the cooldown is **reset** to its base value.

A cooldown of 2 means the weapon fires **every other turn**, while a weapon with a countdown of 3 must wait **two turns** between consecutive attacks. A cooldown of 1 will make a weapon fire **every turn**.

Emp Cannon
dmg:0, cd: 3
emp: 1, hit all enemies

Gun Head
dmg:2, cd: 2

Small Gun
dmg:1, cd: 1

Sniper Rifle
dmg:3, cd: 3
armor pen: 1,
hit smallest part

Acid Gun
dmg:0, cd: 2
acid: 2, 2 hits

Roller
dmg:1, cd: 3
bonus dmg to small

In addition to **damage** value and **cooldown** most weapons have additional **effects** and properties, such as **multiple hits**, bonus damage vs particular enemies, different kind of damage and many more.

For more details see the **game mechanics section**.

Attacks

As previously mentioned the **bot speed** is crucial in deciding which bot **attacks first**.

When two bots weapons cooldowns count down to zero the **same turn**, they will fire in order, **higher speed** bots **fire first**, bots tied for the same speed will fire at the same time.

Please note that a bot which fires first has a great advantage, if its attack hits and **destroys the enemy weapon** it will prevent the enemy attack!

```
Defender        HP: 3, Ar: 1, Sz: 2
Turtle Armor    HP: 8, Ar: 2, Sz: 6
Heavy Treads    HP: 6, Ar: 1, Sz: 4
Hammer          HP: 4, Ar: 1, Sz: 4
Shield          HP: 6, Ar: 2, Sz: 4

Speed:  2
Menace: 3
```

```
Ninja              HP: 2, Ar: 0, Sz: 1
Small Heavy Armor  HP: 5, Ar: 2, Sz: 3
Quad Wheels        HP: 4, Ar: 0, Sz: 4
Lance              HP: 4, Ar: 1, Sz: 4
Shotgun            HP: 3, Ar: 0, Sz: 3

                   Speed:   6
                   Menace: -2
```

In summary, when a **weapon cooldown** reaches 0 it fires, bots with **higher speed fire first**, then the weapon cooldown is **reset**.

But how bots **choose their target**? And **which part** of the targeted enemy bot will be **hit**?

Target Choice

Target choice is driven by the **menace attribute** of the enemy team bots.
When the **menace** attribute of a bot is greater than zero, it represents the bot propensity and ability of **drawing enemy fire**. This is often granted by **armored** or **melee** parts, typical of bots willing to go **all in** and **protect** their teammates.

When the menace attribute is less than zero the opposite is true. A bot with a **negative menace** value is bot good in **hiding**, which usually **avoid** getting **targeted**. Stealth bots which fire from the distance usually have a negative menace value.

But how this works? Normally each bot has the **menace** attribute equal to 0 and the same probability to be chosen as a target. In the case of all enemy bots having the same menace value, when a bot attacks there is a 1/3 chance the attack is directed to any specific enemy bot.

But many parts have specific abilities than can **change** the **menace** attribute of a bot, and then change the probability the bot is chosen as a target by an enemy attack.

The probability for the bot **i** to be chosen as a target follows this **formula**:

$$p = \frac{\left(1 + |m_i|\right)^{\mathrm{sign}\left(m_i\right)}}{\sum_{b \in \mathrm{team}} \left(1 + |m_b|\right)^{\mathrm{sign}\left(m_b\right)}}$$

So in the case of all bots having the **same menace** attribute value the **probability** will be the **same** for every bot: **1/3**.
But if one of the bot is equipped with a **Ninja** head (menace: -1), then the probability of being chosen as a target becomes: **0.5 / 2.5 = 0.2** i.e. **20%**, while the other two bots have both a **40%** probability to be targeted by enemy attacks.

Please note that **destroyed bots** cannot be chosen as targets, so they will not appear in the above formula: if two bots remain, and they have the same menace value, then each of them will be targeted with probability **1/2**.

Target Choice

If in addition to the **Ninja** head the bot was equipped with a **Camo** body (menace: -2), then its probability to be targeted would be around **11%** , while its two teammates would be targeted each around **44.5%** of the times.

A bot equipped with **Sword** (menace: +1) and **Shield** (menace: +1) would have a **60%** to be chosen as a target, while its teammates (if they all have menace 0) would have both only a **20%** chance to be attacked.

See the following example where the two bots described above are in the same team.

Ninja head + **Camo suit**
menace: -2
prob. formula weight: 1/4
probability ≈ 4.76%

Sword + Shield
menace: 2
prob. formula weight: 4
probability ≈ 76.19%

No menace modifiers
menace: 0
prob. formula weight: 1
probability ≈ 19.95%

More than **76%** of the enemy attacks will be then directed at the **armored** melee bot!
So, until the **sword+shield** bot survives, the other two bots will be kept safe from harm, especially the **stealth** bot. This is a balanced team composition: an armored bot tanking damage and two relatively more fragile damage dealers.
But every strategy has **counters**....

Exceptions:
Some bots **Heads** are equipped with special **targeting systems**, which do not follow the menace formula when choosing target... rendering less useful the tank + damage dealers strategy.

For example a bot equipped with the **Scope** Head ignore the menace modifiers of enemy bots, so it will attack every enemy bot with the same probability.
The **Devourer** head will instead always target the bot with less **HP**.

Part Hit

We saw how the **attack target** is decided, now let's see **which part** of the targeted bot **get hit**.
As previously mentioned every bot part has a **size attribute**, the size attribute is crucial in deciding which part of the bot will get hit by an attack. **Bigger parts** have a **higher probability** to be hit than smaller parts, **proportionally** to the size of the part and relative to the sum of the size of all the not yet destroyed parts.

For example:

```
Killer Head    HP: 3, Ar: 0, Sz: 1
Basic Armor    HP: 6, Ar: 1, Sz: 4
Standard Legs  HP: 4, Ar: 1, Sz: 3
Small Gun      HP: 3, Ar: 0, Sz: 2
Sniper Rifle   HP: 3, Ar: 0, Sz: 4
```

```
Speed:    5
Menace:   0
```

The bot parts sizes are 1, 4, 3, 2, 4 for a total of **14.** Then, if none of them has been already destroyed, the **probabilities** to hit a specific part are:

- Head: 1/14
- Body: 4/14
- Legs: 3/12
- Small Gun: 2/12
- Laser Rifle: 4/12

Exception:
Shields and the **Turtle Armor** have a particular ability which disregard size calculation and make these parts **always take** the hit (unless they have been already destroyed). This is particularly useful for protecting the other parts, especially in case of a powerful but fragile weapon.

Moreover some weapons, such as the **Sniper Rifle** or the **Knife**, follow different rules when deciding where the hit lands.

Destroyed Parts

You sent your team to **battle**, the fight is fierce, shots are fired, explosions wreck your team, parts get **destroyed**, but your bots **continue to fight** until the enemy team is **defeated** or they are all destroyed.

When a bot part **HP go to zero** that part gets **destroyed**, becoming totally **useless**. It will not grant **abilities** or bonuses, if it's a weapon it **cannot be fired**. Moreover it won't be considered when deciding which part get hit.

If the destroyed part was the bot's **head** than the damage to the bot's **targeting system** will rise all the weapons **base cooldowns** by 1 for the rest of the batlle. An headshot is a good way to reduce the rate of fire of enemy bots!

When the **legs** are destroyed, the bot **base speed lowers** to a value of **3**... this can be very dangerous to bots which are equipped with particularly heavy parts that **slow** them down, in this case the bot's speed will be dangerously close to 0 (a bot with 0 speed is immobile and can't fire).

Finally, if the bot's **body** is destroyed the bot is **totally destroyed**... there is a clear advantage in equipping an armored body!

Game mechanics

Disclaimer:
Please note that we are still developing the game and there may be still some **balance** adjustments!

- **Armor Penetration X**: Ignore the first X points of armor when dealing damage to an armored part

- **Armor Negating**: Ignore all armor of the hit part

- **Shield**: When the bot receive a hit, assign it to the part with the shield ability (if more than one part with this ability choose one of them at random)

- **Force Field**: one damage reduction from the first ranged attack received, refresh after 2 turns when used

- **Slow X**: Reduce enemy bot speed by X, at the end of every turn the affected bot gain back 1 point of the lost speed

- **Emp X**: +X to all the cooldowns of the enemy bot hit

- **Acid X**: the affected part get X point of acid, at the end of each turn acid counts down by one, the affected part lose one armor, or if it has none, one HP.

- **Bonus Dmg to slow**: +X bonus damage where X = 5 − enemy bot speed, X cannot be less than 0

- **Bonus Dmg to small**: +X bonus damage where X = 15 − total enemy size, X cannot be less than 0, consider also destroyed parts when calculating size

- **Bonus Dmg to big**: +X bonus damage where X = total enemy size -17, X cannot be less than 0, consider also destroyed parts when calculating size

Parts – Heads

	Part	Rar	HP	Ar	Sz	Attacks/Abilities
	Eagle	C	3	0	1	Speed + 2
	Beast	C	3	0	2	DMG 1, CD 3, Bonus vs small
	Killer	C	3	0	1	+ 1 damage to body hits
	Hunter	C	3	0	1	Ignore enemy shields, Armor Pen. +1
	Armored	C	3	1	2	None
	Samurai	C	3	0	2	Menace +2 vs Melee
	Compact	C	3	0	2	No CD malus when destroyed
	Force Field	U	2	0	1	Force Field
	Devourer	U	3	0	2	Target lowest HP enemy (ignore menace)
	Gun	U	2	0	3	Ranged Atk: DMG 1, CD 2
	Heavy	U	3	2	3	Speed -1
	Defender	U	3	1	2	Menace +1
	Tracking	R	2	0	1	All starting CD 0, Speed -1
	Ninja	R	2	0	2	Menace -1
	Optics	R	3	0	1	Ignore enemy menace modifiers

Parts – Bodies

Part	Rar	HP	Ar	Sz	Attacks/Abilities
Acid Launcher	C	5	0	6	Acid 1X2, CD 2
Tentacles Body	C	5	0	5	DMG 1, CD 2, Slow 2
Fat Body	C	8	0	6	Speed -1
Basic Armor	C	6	1	4	None
Heavy Armor	C	7	2	5	Menace +1, Speed -1
Agile Body	C	6	0	4	+2 speed
Small Armor	C	5	1	3	None
Micro Rocket Launcher	U	5	0	6	DMG 1x2, CD 3, hit all enemies
Turtle Armor	U	8	2	6	Menace +1, Speed -2, Shield
Samurai Armor	U	7	1	5	Menace +1, Melee DMG reduction 1
Force Field Body	U	6	0	4	Force Field
Small Heavy Armor	U	5	2	3	None
Berserker Suit	R	4	0	3	Menace +1, Speed +1, All CD -1
Camo Suit	R	5	0	3	Menace -2
Diamond Armor	R	5	1	4	Immune to Acid & EMP

Parts – Legs

Part	Rar	HP	Ar	Sz	Attacks/Abilities
Heavy Tank Treads	C	6	1	4	Speed 4
Light Tank Treads	C	5	0	4	Speed 4, immune to Slow
Armored Legs	C	4	1	3	Speed 5
Quad Legs	C	5	1	4	Speed 5
Heavy Armor Legs	C	4	2	3	Speed 5, Menace +1
Small Legs	C	4	1	2	Speed 5
Wheels	C	4	0	3	Speed 6, Menace -1
Roller	U	6	0	4	Speed 4, DMG 3, CD 3, Bonus vs small
Spider Legs	U	4	0	4	Speed 5, Slow 2, CD 2
Samurai Legs	U	4	1	4	Speed 5, Menace +2 vs Melee
Agile Legs	U	4	0	3	Speed 6, Immune to Slow
Quad Wheels	U	4	0	4	Speed 6, Menace -1
Tripod	R	4	0	3	Speed 4, All CD +1, DMG +1, Armor Pen. +1
Force Field Legs	R	4	0	3	Speed 5, Force Field
Jet	R	3	0	2	Speed 8, Menace -2
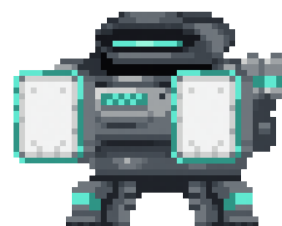
Parts – Weapons

Part	Rar	HP	Ar	Sz	Attacks/Abilities
Harpoon	C	5	0	4	DMG 2, CD 2, Slow 2
Small Shield	C	5	1	3	Shield, DMG 1, CD 2
Shield	C	6	2	4	Menace +1, Shield, DMG, CD 2
Sword	C	5	1	4	Menace +1, DMG 3, CD 2
Chainsaw	C	4	0	4	DMG 3, CD 2, +1 DMG to weapon hits
Lance	C	4	1	4	DMG 2, CD 2, Ar Pen 1, bonus vs Slow
Small Gun	C	3	0	2	DMG 1, CD 1
Big Gun	C	3	0	3	DMG 3, CD 2
Machine Gun	C	3	0	4	DMG 1x3, CD 2
Shotgun	C	3	0	3	DMG 1x4, CD 3
Emp Gun	C	3	0	3	EMP 1, CD 2
Laser Rifle	C	3	0	4	DMG 3, CD 2, Armor Negating
Deceleration Gun	C	3	0	2	DMG 2, CD 2, Slow 2
Acid Gun	C	3	0	3	Acid 2x2, CD 2
Energy Sword	U	4	0	4	DMG 3, CD 2, Armor Negating
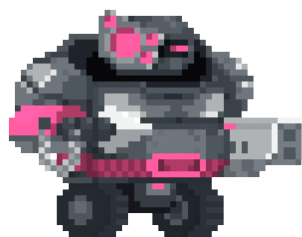
Parts – Weapons

Part	Rar	HP	Ar	Sz	Attacks/Abilities
Knife	U	3	0	2	DMG 2, CD2, Hit Weapons
Claw	U	5	1	3	DMG 1x3, CD 2
Axe	U	4	1	3	DMG 1, CD 1
Driller Lance	U	4	0	4	DMG 2, CD 2, Armor Neg, bonus vs Slow
Hunting Rifle	U	3	0	4	DMG 2, CD 2, bonus DMG vs Big
Sniper Rifle	U	3	0	4	DMG 3, CD 3, Armor Pen. 1, Hit smallest part
Adv. Acid Gun	U	3	0	4	Acid 2x2, CD 3, hit all enemies
Rocket Launcher	U	3	0	4	DMG 3x2, CD 3
Particle Emitter	U	3	0	4	DMG 1X3, CD 3, Ignore Armor
Hammer	R	4	1	4	DMG 2, CD 2, bonus vs Small
Autogun	R	3	0	4	DMG 1x3, CD 3, Base CD -1 after every shot
Gauss Rifle	R	3	0	4	DMG 5, CD 3, Armor Pen. 2
Emp Cannon	R	3	0	4	EMP1, CD 3, hit all enemies
Plasma Gun	R	3	0	2	DMG 1x2, CD 2, Armor Negating
Adv. Particle Emitter	R	3	0	4	DMG 1x2, CD 3, Ignore Armor, Hit all enemies
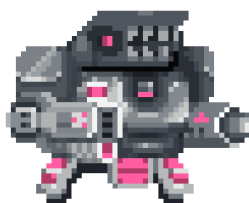
Wrap Up

Two teams of **three bots** face each other. They are armed with a **vast arsenal** of different weapons, from slow firing **artillery** and **energy weapons** to automatic guns and **melee** weapons.

They exchange blows, **faster bots attack first**, a big and slow bot **protects** its teammates and get the most part of the enemy fire, it loses its weapons but keep **standing**… the battle continues until a team manages to **destroy** the other (or a set number of turns is reached).

We are planning to introduce **more game modes**, first by adding **best of three/five matches**, with players able to make modifications to the team between rounds.

Other ideas in consideration are smaller/bigger teams, free for all, other objectives, terrain effects.

But first of all we want to follow **community feedback and suggestions**.
The main purpose of a game is to be **fun to play**, and only players can judge that.. so we better be following your advice!