Overview:

The FTC Block Party – CS2N Mode Fall 2013 Challenge is a two-minute long competition utilizing the Robot Virtual Worlds environment. Robots are programmed with Autonomous programs in order to score as many points as possible within the Match. Multiple elements have been added to the field that allow this game to be played using autonomous-only programming, such as colored lines and tiles, IR Beacons, walls, and Auto Load Zones. The game’s time is tracked using the RVW game’s Internal Timer, which will be used in the final scoring metric to determine high scores.

A Player can earn points during a Match by placing Blocks into any of the Goals on the Pendulum(s), by placing Blocks onto the Floor Scoring Area(s), by raising a Flag during the End Game period, or by having a Robot Hang using the Pull-Up Bar during the End Game period. Blocks scored in Outer Pendulum Goals are worth 3 points each, Blocks scored in the Inner Pendulum Goals are worth 2 points each, and Blocks scored in the Floor Scoring Areas are worth 1 point each. If the Pendulum is Balanced at the end of the Match, a multiplier will be applied to a Player’s total score.

The robot can begin the Match in either of the two Start Positions. The Match begins when the Player presses the Game Start Button.
Definitions:

**Autonomous Mode** – The Robot operates and reacts only to sensor inputs and to commands pre-programmed by the player into the onboard Robot control system.

**Auto Load Zone** - The areas of the Playing Field where the Blocks are automatically loaded onto a Robot during a Match. There are two Auto Load Zones on the Playing Field, located in opposite corners of the field. The Auto Load Zones will automatically load Blocks onto the Robot when it enters the Zone and activates its end effector, but only if the Robot is not already carrying Blocks.

**Balanced Pendulum** – A Pendulum is considered Balanced if the black ‘needle’ attached to the fulcrum point of the Pendulum is within the white zone of the balance indicator (also attached to the Pendulum).

**Base Tile** – One of two available areas that the Robot can start a Match in. A Robot can be move to a Base Tile during a Match by using the Robot Reset Button.

**Block** – The game object in the FTC Block Party competition that can be Scored in the Inner Pendulum Goals, Outer Pendulum Goals, or Floor Scoring Area for points. A Match is played with 100 Blocks. Each Block Zone contains 50 Blocks at the start of a Match.

**Bridge** – The raised structure in the middle of the Playing Field. Two Pendulums are attached to its sides and the Pull-Up Bar resides above it.

**Code** – A program that is loaded into the Robot which enables it to play the Match.
*End Game* – The final 30 seconds of a *Match*.

*Flag* – Either of the two *Flags* (two blue) located in the corner of the *Playing Field*. These *Flags* can be raised by spinning the mechanism at the bottom of the *Flag’s* pole clockwise during the *End Game*. The *Flag* can be raised to a *Low Mark* or a *High Mark*.

*Floor Scoring Area* – The areas (outlined by tape) directly below the *Pendulums*, extending in a plane upwards to the top of the *Pendulum*. This plane is shown in Figure 3, below.

![Figure 3: The scoring plane for the Floor Scoring Area.](image)

*Game Start Button* – This is the button on the user interface that the *Player* presses to start the *Match*.

*Game Time* – The combination of the amount of time that the *Match* has been running which is measured by the *Internal Timer* in milliseconds.

*Game Time Remaining* – The amount of time left in the *Match*. Each *Match* is 120 seconds long. Once a player presses the *Game Start Button* the *Game Timer* begins to count down from 120 to 0 seconds. When the *Game Time Remaining* reaches 0, the *Match* ends.

*Hanging* – A *Robot* is considered *Hanging* if it is supported solely by the *Pull-Up Bar* and is not in contact with the *Playing Field* or *Bridge*. *Hanging* will only be scored if the *Hang* is initiated during the *End Game*. If the *Hang* is initiated before the *End Game*, the *Robot* must completely detach itself from the *Pull-Up Bar* and reinitiate the *Hang* during the *End Game* in order to score points with the *Hang*.

*High Mark* – A *Flag* that is raised above the third black mark (from the bottom) on the *Flag’s* pole during the *End Game* is considered to have reached the *High Mark*. If a *Flag* is raised before the *End Game*, the *Flag* must be fully lowered and re-raised during the *End Game* in order for it to be worth points.

*Inner Pendulum Goal* – A rectangular box nearest to the center of a *Pendulum*. Each *Pendulum* contains two *Inner Pendulum Goals*. *Blocks* can be *Scored* in an *Inner Pendulum Goal* for two (2) points each.
**Internal Timer** – The internal timer is a clock built into the RVW software that tracks the time in milliseconds that the **Player** has been playing the **Match**.

**IR Beacons** – Two **IR** (Infrared) **Beacons** are located underneath the **Flag** poles’ handles to assist with navigation to the **Flag** poles (one per flag).

**Low Mark** – A **Flag** that is raised above the second black mark (from the bottom) on the **Flag**’s pole during the **End Game** is considered to have reached the **Low Mark**. If a **Flag** is raised before the **End Game**, the **Flag** must be fully lowered and re-raised during the **End Game** in order for it to be worth points.

**Match** – A **Match** consists of a two minute (120 second) **Autonomous Mode** programming challenge.

**Outer Pendulum Goal** – A rectangular box furthest from the center of a **Pendulum**. Each **Pendulum** contains two **Outer Pendulum Goals**. Blocks can be **Scored** in an **Outer Pendulum Goal** for three (3) points each.

**Pendulum** – Either of the blue structures attached to the sides of the **Bridge** in the center of the Playing Field. Each **Pendulum** contains two **Inner Pendulum Goals** and two **Outer Pendulum Goals**.

**Player** – The person that wrote the code and is playing the **Match**. The **Player** must meet all eligibility requirements for the RVW Challenge in order to compete.

**Playing Field** – The 12’x12’ surface that the **Match** is played on, designated by the solid walls enclosing it.

**Pull-Up Bar** – The bar residing above the **Bridge** that a **Robot** can **Hang** from during the **End Game** for points.

**Robot** – A programmable object that a **Player** can load into the virtual world.

Robot Reset Button - A button on the RVW Game interface that allows the **Player** to pause the **Match** and reset the **Robot**. The button allows the **Player** to select another **Robot** to load code onto and run.

**RVW** – Robot Virtual World

**Scored** – A **Block** is considered ‘**Scored**’ if it resides in an **Inner Pendulum Goal**, **Outer Pendulum Goal**, or **Floor Scoring Area**, including the vertical plane above the **Pendulum Goals** and **Floor Scoring Area**. Any **Block** can only be **Scored** in one of these areas at a time.

**Student** – Anyone enrolled in a pre-college school or home-schooled as part of a pre-college educational curriculum.

**Warp Zone** – One of two designated areas on the **Playing Field** that can be used with the **Robot Reset Button** to move the **Robot** to its corresponding **Base Tile** (**Warp Zone 1** to **Base Tile 1**, for example) with no time penalty.
Loading Programs:

A Player may reset the Robot and load a new program/change the robot being used by utilizing the Robot Reset Button. The following rules apply when using the Robot Reset Button:

- If the Robot is in a Warp Zone, it can be sent to the corresponding Base Tile with no penalty.
- A Player may only load a new program onto the Robot while it is on a Base Tile.
- While on a Base Tile (and before the Match has been started or unpaused), Players may switch their Robot model, load a program to the Robot, or switch which Base Tile the Robot starts the program from.
- Players may also use the Robot Reset Button while the Robot is not on a Warp Zone or Base Tile to move the Robot to a Base Tile; however, doing so will subtract ten (10) seconds from the Game Time Remaining.

Scoring Points:

Points can be scored during a Match by programming the Robot to perform the following actions. The Player’s final score is the highest score achieved during the Match. Alliance color has no bearing on how an object is scored; this means that both Flags can be raised, the Blocks can be scored in any Pendulum Goal or Floor Scoring Area, and the Robot can Hang from any location on the Pull-Up Bar.

- Each Block placed on a Floor Scoring Area is worth one (1) point.
- Each Block placed in an Inner Pendulum Goal is worth two (2) points.
- Each Block placed in an Outer Pendulum Goal is worth three (3) points.
- A Balanced Pendulum at the end of a Match applies a 1.5x multiplier to all Blocks scored in that Pendulum’s Inner and Outer Goals.
- A Flag that is raised to the Low Mark during the End Game is worth twenty (20) points.
- A Flag that is raised to the High Mark during the End Game is worth thirty-five (35) points.
  - A Flag will only be scored for the highest level Mark it has reached at the end of the Match, and will only be scored if the Flag was raised during the End Game.
- A Robot that is Hanging from the Pull-Up Bar at the end of a Match is worth fifty (50) points.
  - A Robot will only be credited for a Hang if the Hang occurs during the End Game.

Tiebreaker:

If two Players achieve the same score, the tiebreaker will be determined by which Player was able to achieve the high score in the shortest amount of Game Time (tracked by the Internal Timer and displayed as the fractional part of the score).
Divisions:
There will be 3 Divisions for the CS2N FTC Driver Skills Challenge:

- **Middle School**: For students entering 8th grade or lower at the start of the 2013-2014 school year
- **High School**: For students entering grades 9th-12th at the start of the 2013-2014 school year
- **Open**: This division is open to all participants.

Prizes:
A listing of the prizes for the FTC Block Party – CS2N Mode Fall 2013 competition can be found on the CS2N website, cs2n.org.

Other Rules
- Any Player intentionally using glitches or hacks in the RVW environment to obtain a higher score than would normally be possible may be subject to disqualification from the Competition.

- Each Player is eligible for only one prize per Competition. In the case of multiple high scores that are eligible for prizes that are submitted by the same Player, only the highest score will be used in determining prizes for that Player.

- All Players must adhere to the Robot Virtual World Competition Rules as they are written, and must abide by the listed intent of the rules. Every Player has the opportunity to ask for official rule interpretations in the RVW Robotics Competition Question & Answer Forum at www.robotc.net/forums. Any responses in this Q&A forum should be treated as official rulings from the RVW Robotics Competition Game Design Committee, and represent the correct and official interpretation of the RVW Robotics Competition Rules.

All submissions must include the program(s) used to achieve the high score, any include or header files needed to run the program, the comments at the top of the program filled out fully, and a fully filled out Programming Order file. Any submission that lacks these documents will be ineligible for prizes.

- Blank RBC templates can be found in the FTC Block Party! Virtual World, as well as the FTC Block Party Sample Programs folder. These files contain the comments at the top of the program that must be filled out and included with every program.
- A blank Programming Order text file can also be found in the FTC Block Party Sample Programs folder. This file must also be completed and included with your file submission.
- Multiple programs should be zipped (with a completed Programming Notebook) for submission. The zipped folder should follow a Lastname_Firstname_Competition.zip naming convention. Example: Smith_John_FTC.zip or Doe_Jane_FTC.zip.
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