HELVETIQ

Unsolved

A game for 2-4 players of age 10+ with a duration of 15 minutes.

Game components

- 44 "Elementary particles" cards:
  - 13 quarks $\overline{q} \longrightarrow q$
  - 8 electrons $e^+ \longrightarrow e^-$
  - 12 gluons g
  - 7 photons γ
  - 4 Higgs bosons H
- 4 player aids
- 1 first player token
- 40 score tokens (14 yellow, 26 green)

Goal of the game

Place elementary particles together to form a Feynman diagram, score its valid vertices and earn the most points.

Setup

Give a player aid to every player. Shuffle all the particles together (in a 3-players game, discard 5 cards and put them back in the box: they won't be used). Give one to each player: this is their secret card, which will be placed after the final round in their diagrams. Place the particle cards in a draw pile and put the score tokens nearby. Leave enough space in front of each player.

Reveal a number of cards at the center of the table: refer to the next table to know the number of cards revealed and the number of game turns:

Players	Cards	Turns
2	3	14
3	4	9
4	5	8

The youngest player begins the game: he/she takes the first player token.

Gameplay

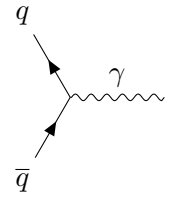
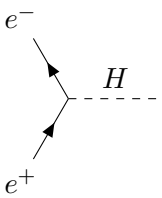
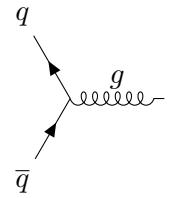
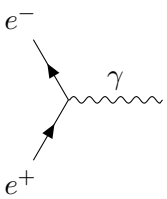
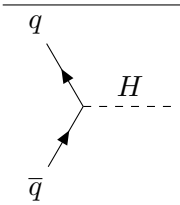
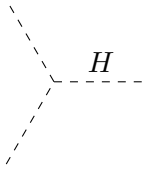
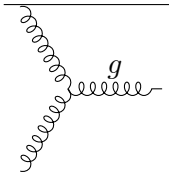
The first player chooses a particle among those available at the center. He/she places it immediately on his play area in front of him/her. Every player does the same, clockwise, and the last card on the table goes back to the first player, who places it. First player token is then passed to the next player, clockwise, new cards are revealed, and a new turn begins.

The game ends when the draw pile is empty. All players reveals their secret card and place it on the table.

Rules for playing cards
The first card can be placed anywhere in front of the player. All the next ones must be placed adjacent to at least one card already placed on the table. The cards must be placed in such a way that the lines encounter at points (that we call *vertices*).
A *vertex* is a group of 3 cards put together around the same point. Some vertices are valid and give you points, whereas invalid ones will make you lose points at the end of the game. If you complete a vertex by playing a third card on it, immediately place a scoring token on it, depend on its point value. See the players aids or section "Scoring" below.

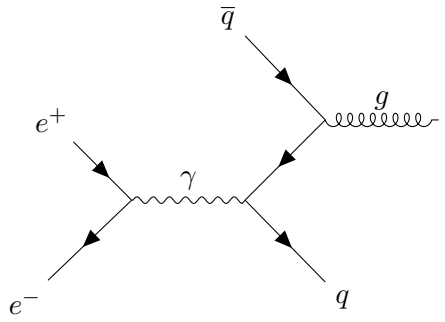
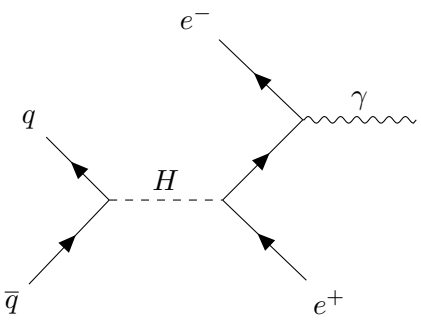
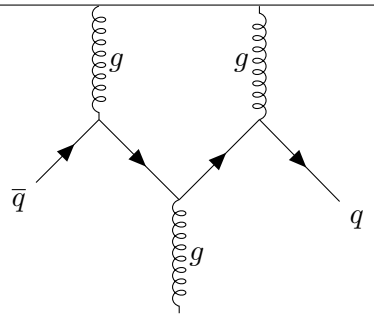
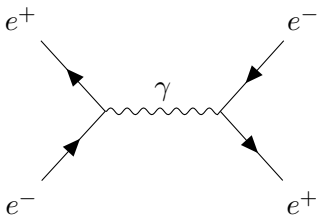
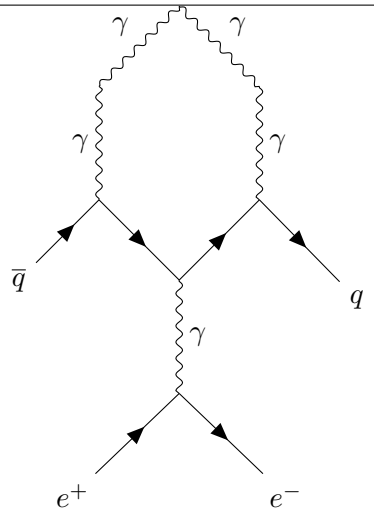
End of the game
The game ends after all the cards have been placed. Players will have the same number of particles in front of them. Players count their points, and the winner is the one that has the most points. In case of a tie, the winner is the one with the least invalid vertices.

Scoring
You score points for every valid vertex in your diagram, depending on their rarity. The table below indicates every possible vertex.
All the other vertices are not valid and make you lose 1 point per vertex at the end of the game. Furthermore, an incomplete vertex with 2 different particles is also invalid and makes you lose 1 point per vertex at the end of the game.

Vertex	**Points**	**Vertex**	**Points**
	2 points		4 points
	2 points		3 points
	3 points		6 points
	2 points		

Advanced scoring
You score 2 bonus points per valid *loop* in your diagram at the end of the game. A *loop* is a closed hexagon composed of 6 cards. For a loop to be valid, it has to be composed of only valid vertices. Incomplete vertices made with 2 of the same particle count as valid too. Invalid loops do not give you bonus points.

Expert scoring
You are an expert in physics and ready to go to the next level? During the game, try to form those sub-diagrams. Depending on their rarity, each is worth a different amount of points. At the end of the game, count your points as usual, then add the points for the sub-diagrams. The player with the most points wins the game.
Beware: Due to the number of cards needed to build those diagrams, this version works for 2 players only. If you are more than 2 players, you can divide the players in 2 teams.

Diagram	**Pts**	**Diagram**	**Pts**
	+2		+3
	+1		+2
	+4		