Text Adventure Puzzle Solution

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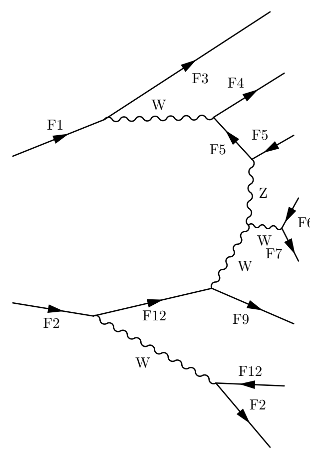
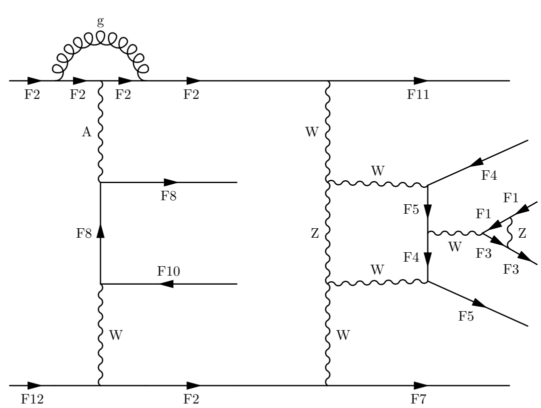
First you spend a lot of time mapping out the levels. They look like this:

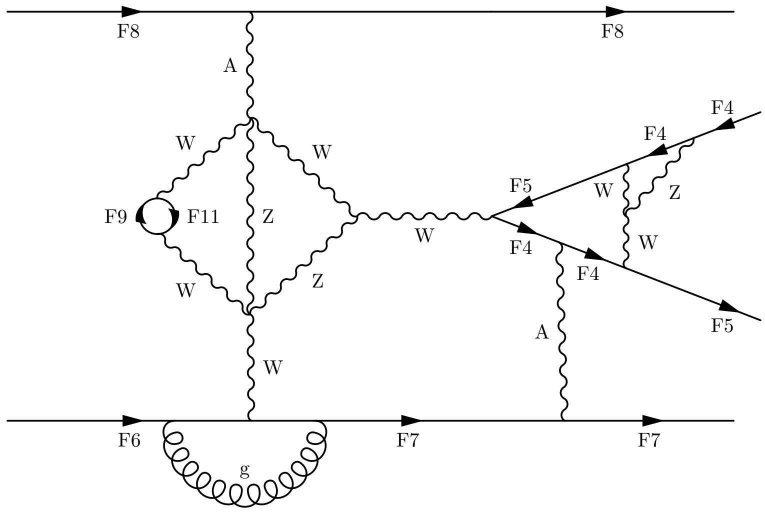
Level 1



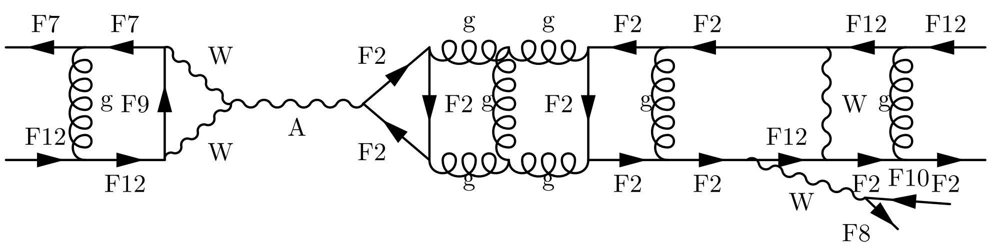
Level 2



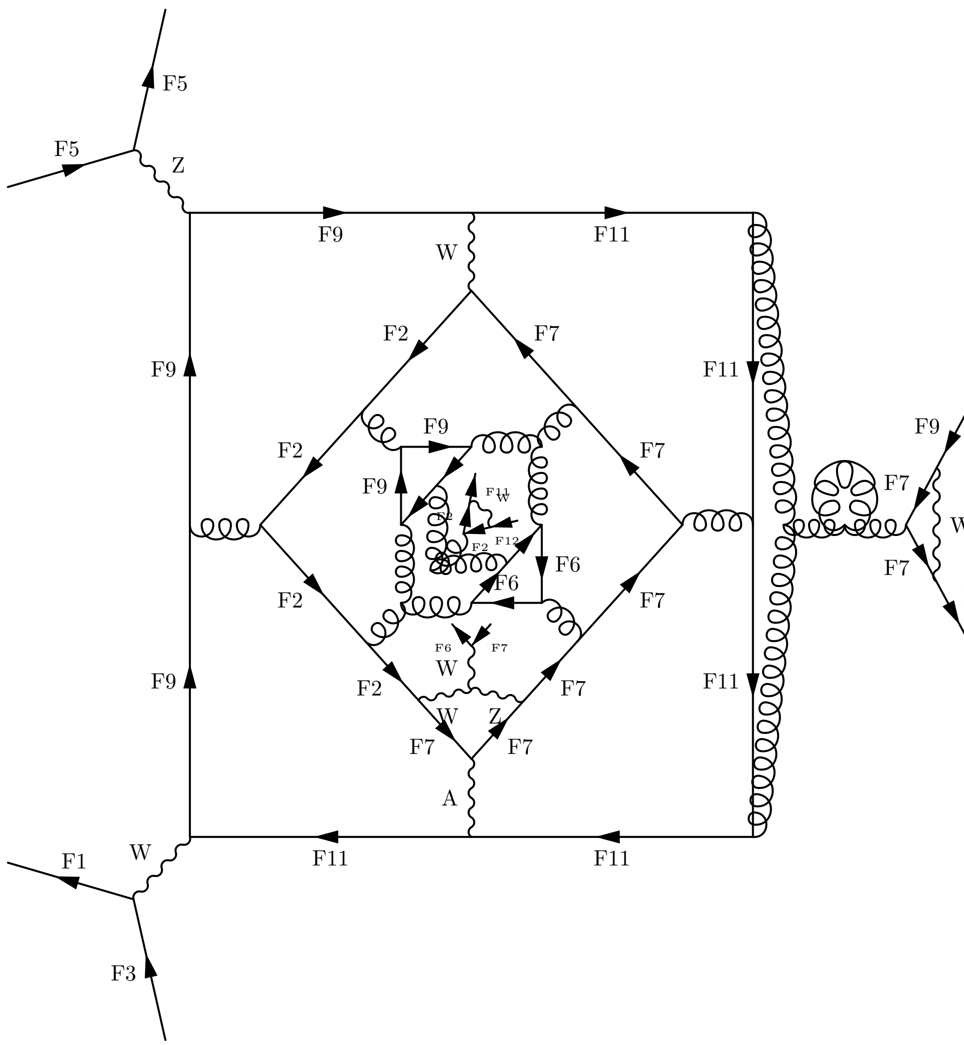
Level 3



Level 4



Level 5



[Apologies for the bad typesetting.]

Particle mapping

After making all these maps, someone on your team who knows physics notices that these look like Feynman diagrams. The W, A, Z, and g labels all match the bosons of the standard model. The standard model has 12 fermions, $u, d, s, c, b, t, e, \mu, \tau, \nu_e, \nu_\mu, \nu_\tau$. By looking at the diagrams we have and comparing to the standard model diagrams, one can get part way to figuring out the mapping from function keys to standard model fermions.

Numbers 2,6,7,9,11,12 interact with gluons, so they must be quarks. By seeing which interact with W's through the CKM matrix, we can group them into up-type and down-type: (7,11,12) and (2,6,9) are the two groups (but we can't tell which is up-type and which is down-type).

The pairs (1,3), (4,5), and (8,10) each interacts with a W, so they must be the three generations of leptons and the corresponding neutrinos.

However, information about generations cannot be determined without knowing something about the masses. The instructions tell you, when you start each level, that one of the entries is "larger" than the other. This gives us the following inequalities:

$$\begin{aligned} m_1 &> m_2 \\ m_2 &> m_{12} \\ m_8 &> m_6 \\ m_{12} &> m_7 \\ m_4 &> m_3 \end{aligned}$$

Leptons 1 and 8 are heavier than quarks, so they can't be neutrinos or the electron, so they must be μ and τ in some order. Since $m_{12} > m_7$ and both are up-type or both are down-type, particle 12 is the strange squark or heavier. Since $m_2 > m_{12}$, particle 2 is the charm quark or heavier. So particle 1 is a lepton heavier than the charm quark, so it's the τ. Since particle 8 is a lepton heavier than a quark, it must be the μ. Particle 4 is electrically charged, from level 3, so can't be a neutrino, and the only remaining possibility is e. So we've got all the leptons.

Then we see that 7 and 12 are two quark of the same charge, both lighter than the muon. That means they're down and strange (and $m_{12} > m_7$) tells us which is which). The remaining down-type quark is 11, so that's b. 2 is a quark between the m_μ and m_τ, which means its got to be c. 6 is an up-type quark less than the muon, so it's u, meaning 9 is t.

Putting it all together:

1	2	3	4	5	6	7	8	9	10	11	12
τ	c	ν_τ	e	ν_e	u	d	μ	t	ν_μ	b	s

Then, following the hint at the end, you plot the particles produced in each Feynman diagram on the grid of standard model particles (arranged by particle charge and generation, as in the grid you get at the end of the game):

	I	II	III
+2/3	u	c	t
0	ν_e	ν_μ	ν_τ
-1/3	d	s	b
-1	e	μ	τ

These give:

X	X	X
X		X
X	X	
X		

X	X	X
X		X
X	X	X

X		
X		
X	X	

	X	
	X	
	X	
	X	

X	X	X
X		X
X	X	X

Reading the pixellated images, the answer is POLIO.