Quark structure of baryons

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1. (a) A baryon is formed from three quarks. There are ten possible combinations of the up, down and strange (u, d, and s) which will make baryons. List these ten combinations.

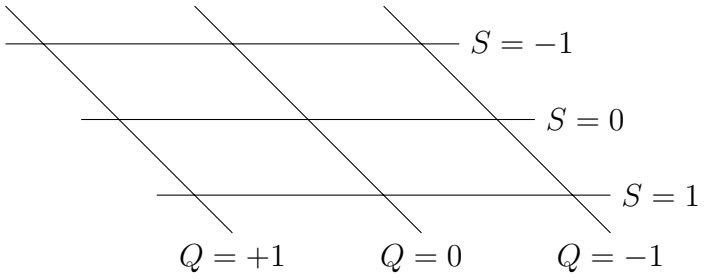
   (b) The table below shows eleven baryons. Using your list from 1a identify the quark structure in each of the baryons.

particle	Charge (Q) / e	Baryon number	Strangeness
p	$+1$	1	0
n	0	1	0
Λ	0	1	-1
Σ^+	$+1$	1	-1
Σ^0	0	1	-1
Σ^-	-1	1	-1
Δ^-	-1	1	0
Δ^{++}	$+2$	1	0
$\overline{\Xi}^0$	0	1	-2
Ξ^-	-1	1	-2
Ω^-	-1	1	-3

   (c) Which two baryons have the same quark structure?

   (d) How may they be different to each other?

   (e) The diagram below is often called the *Baryon Octet*. Copy the diagram, and add on the eight particles at the intersections of the lines. (Don't put any Δs on this diagram.)



   (f) Why is there no particle with a strangeness of -2 and a charge of $+1$?