Grassmannians of arbitrary rank

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Let V be a vector space and let k be a natural number. We call the k-dimensional subspaces points and define lines as sets of k-dimensional subspaces that intersect in a common hyperplane and are contained in common $(k+1)$-dimensional subspace. This yields a geometry called Grassmannian. For this concept V does not have to be of finite dimension. Instead of k-dimensional subspaces one can also consider subspaces of finite codimension. Things get different if one considers subspaces of infinite dimension and infinite codimension as points. In this case, a bunch of problems appear. We will show how these problems can be handled. Furthermore, we give a concept how to define chamber systems and buildings starting with these generalised Grassmannians.