RIGGING A LEG

Introduction
Rigging a figure is a profession in itself. A rigger's job is to rig a figure so that the animator can move the character in any way possible using the minimum of controls and effort. Creating the bones and 3D mathematical relationships between them needed for this can be very complex. In this handout I'll provide links to a few good tutorials on what is known as reverse foot rigging, which allows the foot to peel off the ground in a realistic fashion.

The terms
Rigging has its own vocabulary; here are a few of the words used

Armature - an arrangement of rigid or flexible bones that will control a mesh
Bone - the simplest element of an armature.
Control bone - a bone that controls other bones instead of the mesh
Deformation - the way that a mesh reacts to movement and rotation of the rig
FK (or Forward Kinematics) - when bones higher up the chain (for example, a shoulder) control bones further down the chain (the hand)
Hierarchy - the order in which bones control each other in parent-child relationships
IK (or Inverse Kinematics) - when bones at the end, or near the end, of a chain control those higher up. For example, in an IK rig moving a hand will bring the arm along with it.
Pole target - a non-deforming bone used to control the direction a joint moves, such as the elbow or knee, or the direction of gaze of the eyes
Rig - the combination of an armature, its internal mathematical relationships, and on-screen controls such as 3D or 2D graphics
Root - the topmost bone in an armature; moving the root moves the whole character
Weight map - the amount that each vertex in the character mesh is influenced by a particular bone

Links
There is only simple one guide I recommend to making a reverse foot rig, Bugzilla’s at https://www.youtube.com/watch?v=dWgYP-ABNSk (15m). However, there are many other tutorials on simple foot rigs, such as Sebastian Lague’s at https://www.youtube.com/watch?v=Q9f-WVs3ghI (19m) and complex rigs such as Oliver Villar’s at https://www.youtube.com/watch?v=0U3NjTvwdWI (45m).

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