Step 1

On switch **S1** we need to define the interface connected to the router as a **trunk link.** This will allow traffic from all VLANs to get to the router using that interface. The command to accomplish this is on **S1** is:

```
S1(config)#interface fastEthernet 0/1

S1(config-if)#switch mode trunk
```

NOTE: many errors may rise if the switch port connected to the switch is not configured as a trunk.

Step 2

At this step inter-VLAN routing can be configured on the router. As mentioned earlier, when configuring router-on-a-stick, we use sub interfaces.

Each sub interface is created using the interface ***interface_id.Subinterface_id*** in the global configuration mode. As shown below.

```
Router(config)#interface <interface_ID.Subinterface_ID>
```

NOTE: the "." Between the interface ID and the sub interface ID is a must. The sub interface ID is a logical number but ideally it should describe the VLAN ID.
To create a sub interface which will be used to route for VLAN 10, we will use the command shown below.

```
R1(config)#interface fastethernet 0/0.10
```

This will take us into the sub interface configuration mode which is denoted by the prompt shown below.

```
R1(config-subif)#
```

In the sub interface mode, we can link the VLAN ID to this interface as well as assign it an ip address and a subnet mask.

Step 3

To link the sub interface with the specific VLAN, we use the command "**encapsulation dot1q <VLAN_ID>**" this will specify that this interface will get traffic from the specified VLAN. In our example, the command needed to link VLAN 10 to this sub interface is shown below:

```
R1(config-subif)#encapsulation dot1q 10
```

Step 4

In this mode, we can also assign the sub interface with the ip address and subnet mask which will be used for VLAN 10. The default gateway on the PC's will be used as the interface address as shown below.

```
R1(config-subif)#ip address 192.168.10.1 255.255.255.0
```

Step 5

When all the sub interfaces have been assigned to their respective VLANs, we need to activate the LAN interfaces that they are connected to by issuing the no shutdown command.

```
R1(config)#interface fastEthernet 0/0
R1(config-if)#no shutdown
```

This will activate the interface and allow for inter-VLAN routing.