

# FLUENT - Flow over an Airfoil- Step 3

## Problem Specification

1. Create Geometry in GAMBIT
2. Mesh Geometry in GAMBIT
3. Specify Boundary Types in GAMBIT
4. Set Up Problem in FLUENT
5. Solve!
6. Analyze Results
7. Refine Mesh

Problem 1

Problem 2

## Step 3: Specify Boundary Types in GAMBIT

We'll label the boundary AFE as *farfield1*, ABDE as *farfield2* and the airfoil surface as *airfoil*. Recall that these will be the names that show up under boundary zones when the mesh is read into FLUENT.

### Group Edges

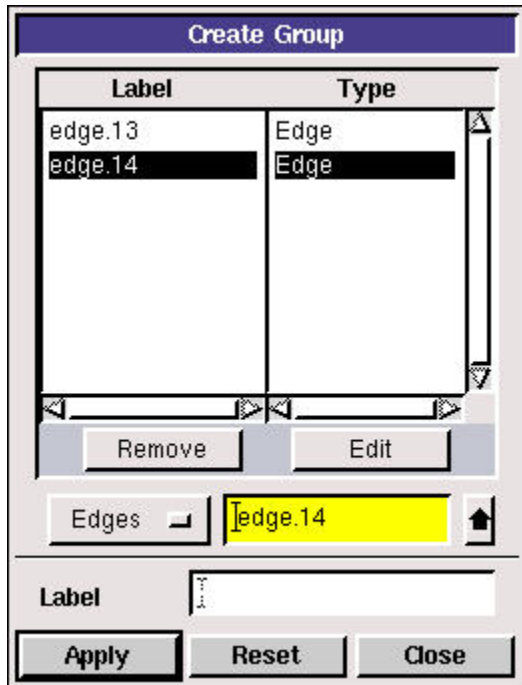
We'll create groups of edges and then create boundary entities from these groups.

First, we will group AF and EF together.

Operation Toolpad > Geometry Command Button > Group Command Button > Create Group

Select **Edges** and enter *farfield1* for **Label**, which is the name of the group. Select the edges AF and EF.

Note that GAMBIT adds the edge to the list as it is selected in the GUI.



Click **Apply**.

In the transcript window, you will see the message "Created group: farfield1 group".

```
Command> group create edge "edge.13" "edge.14"
Created group: group.1
Command> group delete "group.1" lowertopology
Command> group create "farfield1" edge "edge.13" "edge.14"
Created group: farfield1
```

Similarly, create the other two farfield groups. You should have created a total of three groups:

| Group Name | Edges in Group                |
|------------|-------------------------------|
| farfield1  | AF,EF                         |
| farfield2  | AB,DE                         |
| farfield3  | BC,CD                         |
| airfoil    | HI,IG,HJ,JG (name might vary) |

## Define Boundary Types

Now that we have grouped each of the edges into the desired groups, we can assign appropriate boundary types to these groups.

Operation **Toolpad > Zones Command Button**  > **Specify Boundary Types** 

Under **Entity**, select **Groups**.

Select any edge belonging to the airfoil surface and that will select the airfoil group. Next to **Name**:, enter airfoil. Leave the **Type** as **WALL**.

Specify Boundary Types

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Action:

☒ Add
 ☒ Modify
 ☒ Delete
 ☒ Delete all

| Name | Type |
|------|------|
|      |      |

☐ Show labels

Name:

Type:

Entity:

| Label   | Type  |
|---------|-------|
| airfoil | Group |
|         |       |

Click **Apply**.

In the *Transcript Window*, you will see a message saying "Created Boundary entity: airfoil".

Similarly, create boundary entities corresponding to *farfield1*, *farfield2* and *farfield3* groups. Set **Type** to **Velocity-Inlet** for *farfield1* and *farfield2*. Set Type to **Pressure-Outlet** for *farfield3*.

## Save Your Work

Main Menu > File > Save

## Export Mesh

Main Menu > File > Export > Mesh...

Save the file as `airfoil.msh`.

Make sure that the **Export 2d Mesh** option is selected.

Check to make sure that the file is created.

Go to [Step 4: Set Up Problem in FLUENT](#)

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