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Demo: Fitting a Multiple Logistic Regression Model with Interactions Using the Binary Logistic Regression Task

Use the Binary Logistic Regression task to fit a binary logistic regression model and use the backward elimination method. The full model should include all the main effects and two-way interactions.

1. In the Navigation pane, select **Tasks and Utilities**.
2. Expand **Tasks**.
3. Expand **Statistics** and open the **Binary Logistic Regression** task.
4. Select the **stat1.ameshousing3** table.
5. Assign **Bonus** to the Response role, and use the Event of interest drop-down list to specify **1**.
6. Assign **Fireplaces** and **Lot_Shape_2** to the Classification variables role.
7. Expand the **Parameterization of Effects** property and use the Coding drop-down list to select **Reference coding**.
8. Assign **Basement_Area** to the Continuous variables role.
9. On the MODEL tab, select **Custom model**.
10. Click the **Edit this model** icon under Model Effects to specify the model.
11. In the Model Effects Builder window, select all three variables and then select **N-way Factorial**. Select **N=2** to specify a model with all the variables and the associated two-way interaction terms, and then click **Add**.
12. Click **OK**.
13. On the SELECTION tab, use the Selection method drop-down list to choose **Backward elimination**, and change the Significance level to **0.1** to remove an effect from the mode.
14. On the OPTIONS tab, in the Select statistics to display drop-down list, select **Default and additional statistics**.
15. Expand the **Parameter Estimates** property. In the Confidence intervals for odds ratios drop-down list, select **Based on profile likelihood**.
16. Expand **PLOTS**, and in the Select plots to display drop-down list, select **Default and additional plots**.
17. Select **Effect plot**.
18. Modify the code to specify specific levels of each class variable to use as reference levels. On the CODE tab, click the **Edit SAS code** icon.
19. In the CLASS statement, add the options **(REF='0')** immediately after **Fireplaces** and **(REF='Regular')** immediately after **Lot_Shape_2**.
20. Add the statement **units Basement_Area=100;** after the MODEL statement.
21. Click **Run**.

Generated Code

```
ods noproctitle;
ods graphics / imagemap=on;

proc logistic data=STAT1.AMESHOUSING3 plots=(effect);
   class Fireplaces (REF='0') Lot_Shape_2 (REF='Regular')  / param=ref;
   model Bonus(event='1')=Basement_Area Fireplaces Lot_Shape_2
         Basement_Area*Fireplaces Basement_Area*Lot_Shape_2 Fireplaces*Lot_Shape_2 /
         link=logit clodds=pl alpha=0.05 selection=backward slstay=0.1
         hierarchy=single technique=fisher;
   units Basement_Area=100;
run;
```