```
0.8666666746139526,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8583333492279053,
0.8666666746139526,
0.8666666746139526,
0.875,
0.875,
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0.8666666746139526,
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0.8666666746139526,
0.8666666746139526,
0.8666666746139526,
0.8666666746139526]}
```
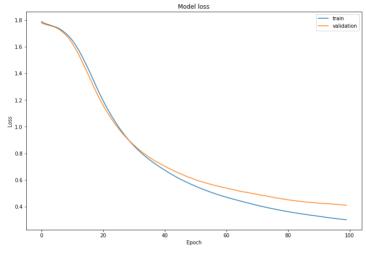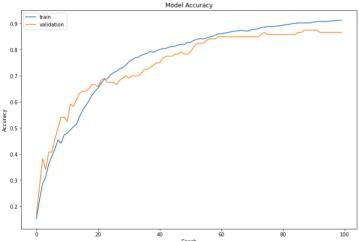
Now visualize the loss over time using `history.history` :

```python
In [31]:
# The history.history["loss"] entry is a dictionary with as many values as epochs that the
# model was trained on.
df_loss_acc = pd.DataFrame(history.history)
df_loss= df_loss_acc[['loss','val_loss']]
df_loss.rename(columns={'loss':'train','val_loss':'validation'},inplace=True)
df_acc= df_loss_acc[['accuracy','val_accuracy']]
df_acc.rename(columns={'accuracy':'train','val_accuracy':'validation'},inplace=True)
df_loss.plot(title='Model loss',figsize=(12,8)).set(xlabel='Epoch',ylabel='Loss')
df_acc.plot(title='Model Accuracy',figsize=(12,8)).set(xlabel='Epoch',ylabel='Accuracy')
```

```
Out[31]: [Text(0, 0.5, 'Accuracy'), Text(0.5, 0, 'Epoch')]
```


Congratulations! You've finished the assignment and built two models: One that recognizes smiles, and another that recognizes SIGN language with almost 80% accuracy on the test set. In addition to that, you now also understand the applications of two Keras APIs: Sequential and Functional. Nicely done!

By now, you know a bit about how the Functional API works and may have glimpsed the possibilities. In your next assignment, you'll really get a feel for its power when you get the opportunity to build a very deep ConvNet, using ResNets!

6 - Bibliography

You're always encouraged to read the official documentation. To that end, you can find the docs for the Sequential and Functional APIs here:

https://www.tensorflow.org/guide/keras/sequential_model (https://www.tensorflow.org/guide/keras/sequential_model)

https://www.tensorflow.org/guide/keras/functional (https://www.tensorflow.org/guide/keras/functional)