

Mobile Application Development

Produced
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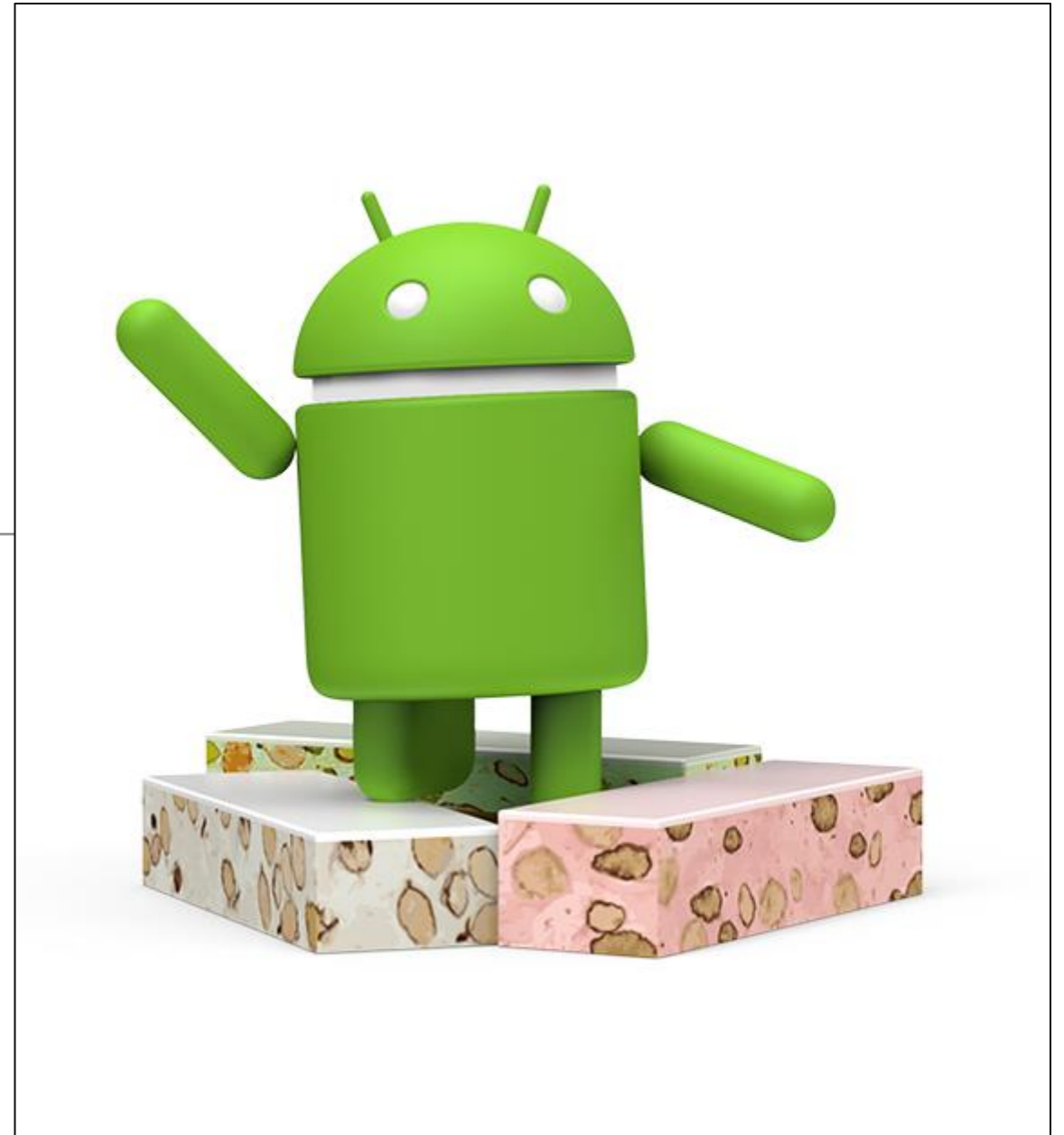


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A First Android Application

Donation App and its Models



Unified Modelling Language (UML)



Good resource: <http://creately.com/blog/diagrams/class-diagram-relationships/>

UML Class Diagrams: Taxonomy

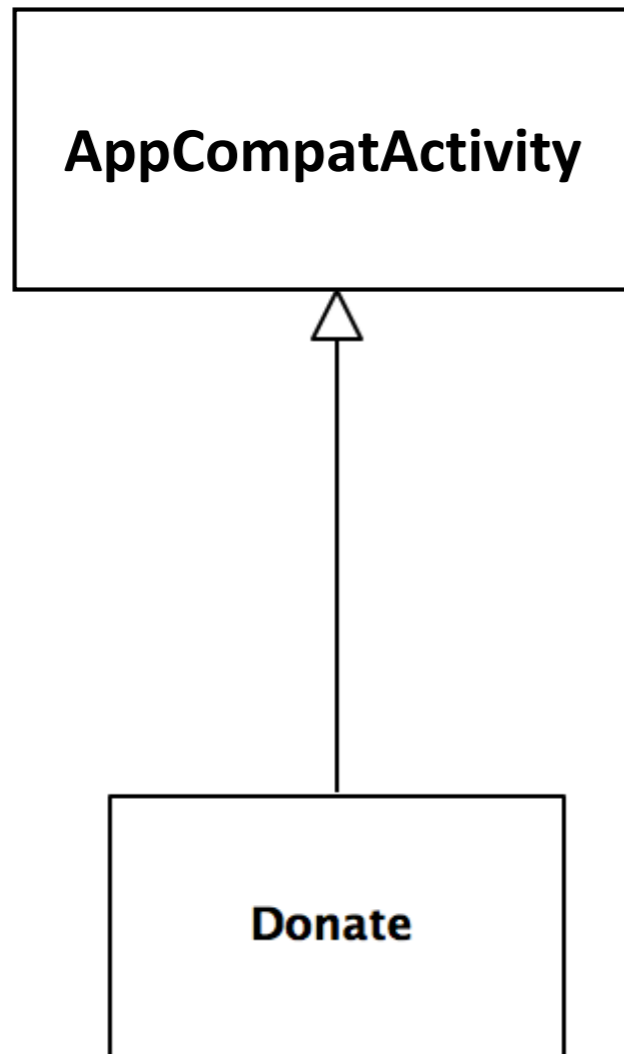
- Class
 - 3 Relationship Types
 - Inheritance
 - Association
 - Uses
 - For Associations - optional levels of detail:
 - Simple
 - Navigable
 - Roles
 - Multiplicity
 - Aggregation

Class

Donate

```
public class Donate  
{  
    ...  
}
```

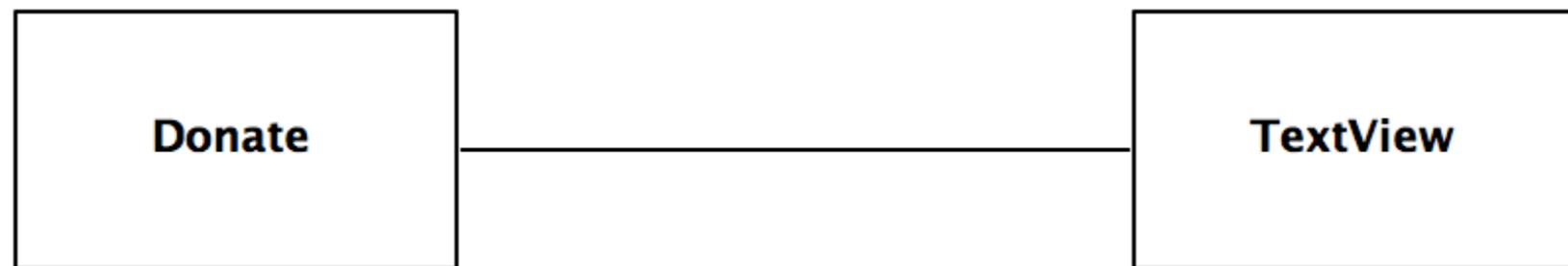
Inheritance Relationship (the “is a” relationship)



```
public class Donate extends AppCompatActivity
{
    ...
}
```

Association: Simple

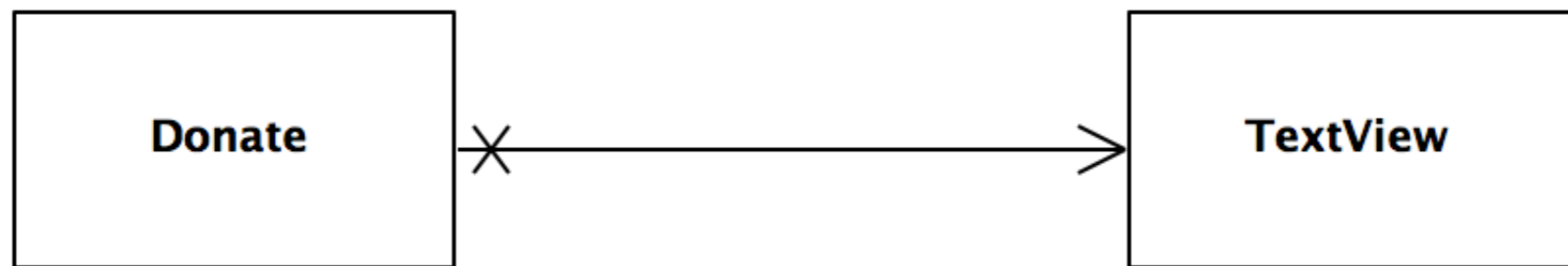
- Association is often called the “has a” relationship.
- No details of relationship specified.



```
public class Donate extends AppCompatActivity
{
    private TextView amountTotal;
    ...
}
```

Association: Navigable / Directed

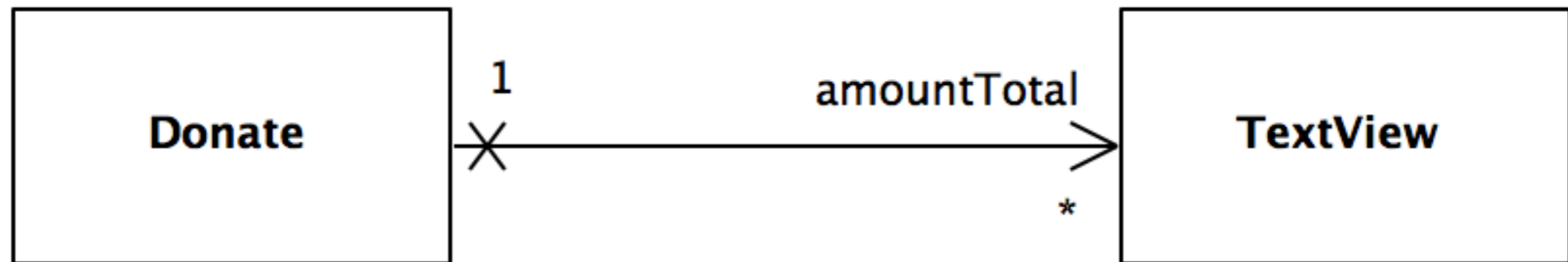
- We can reach the TextView object from Donate, but not vice versa



```
public class Donate extends AppCompatActivity
{
    private TextView amountTotal;
    ...
}
```

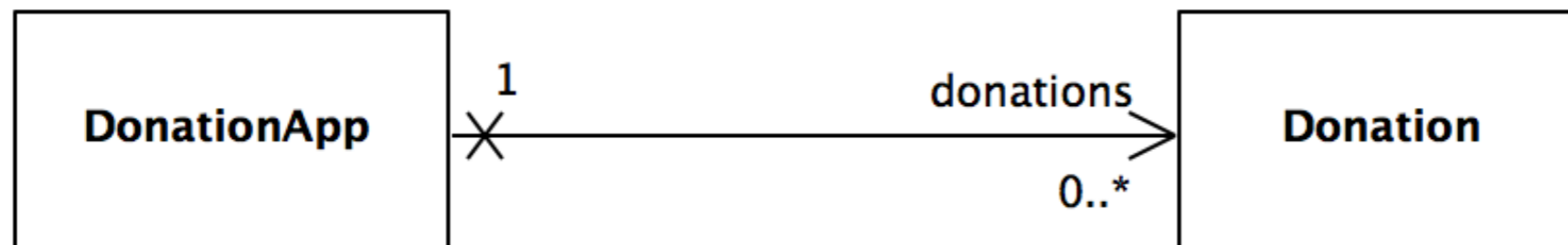

Association: Roles

- The association is specifically named - the attribute name in this example.



```
public class Donate extends AppCompatActivity
{
    private TextView amountTotal;
    ...
}
```

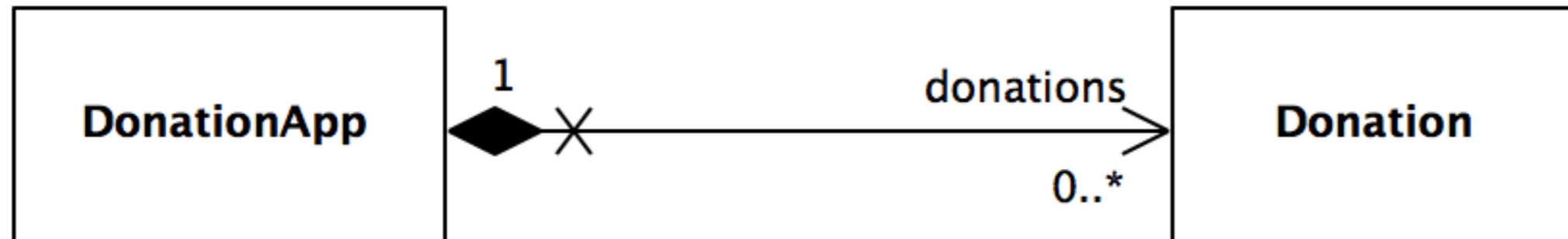
UML Association - Multiplicity



```
public class DonationApp extends Application
{
    ...
    public List <Donation> donations = new ArrayList<Donation>();
    ...
}
```

- DonationApp can have many Donation objects.
- We deliberately do not show the ArrayList class.
- Focus instead on the one-to-many relationship (cardinality) between DonationApp and Donation classes.

UML Association - Aggregation

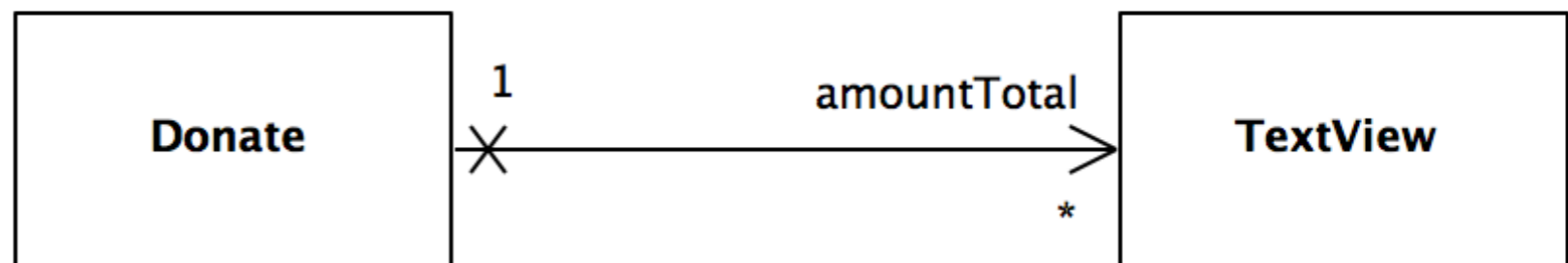
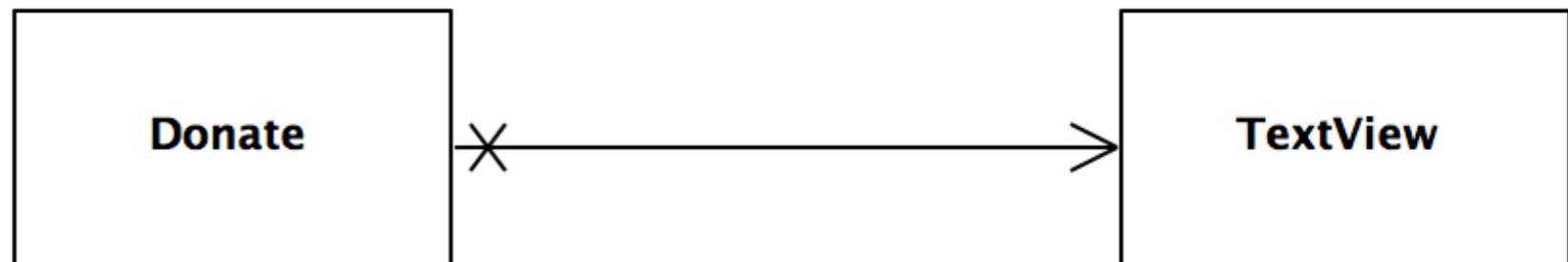


```
public class DonationApp extends Application
{
    ...
    public List <Donation> donations = new ArrayList<Donation>();
    ...
}
```

- The aggregation kind (composited) indicates that the DonationApp somehow controls the lifespan of the Donation objects.
- DonationApp ‘is composed of’ Donation objects, and is responsible for creating them and perhaps also destroying them.

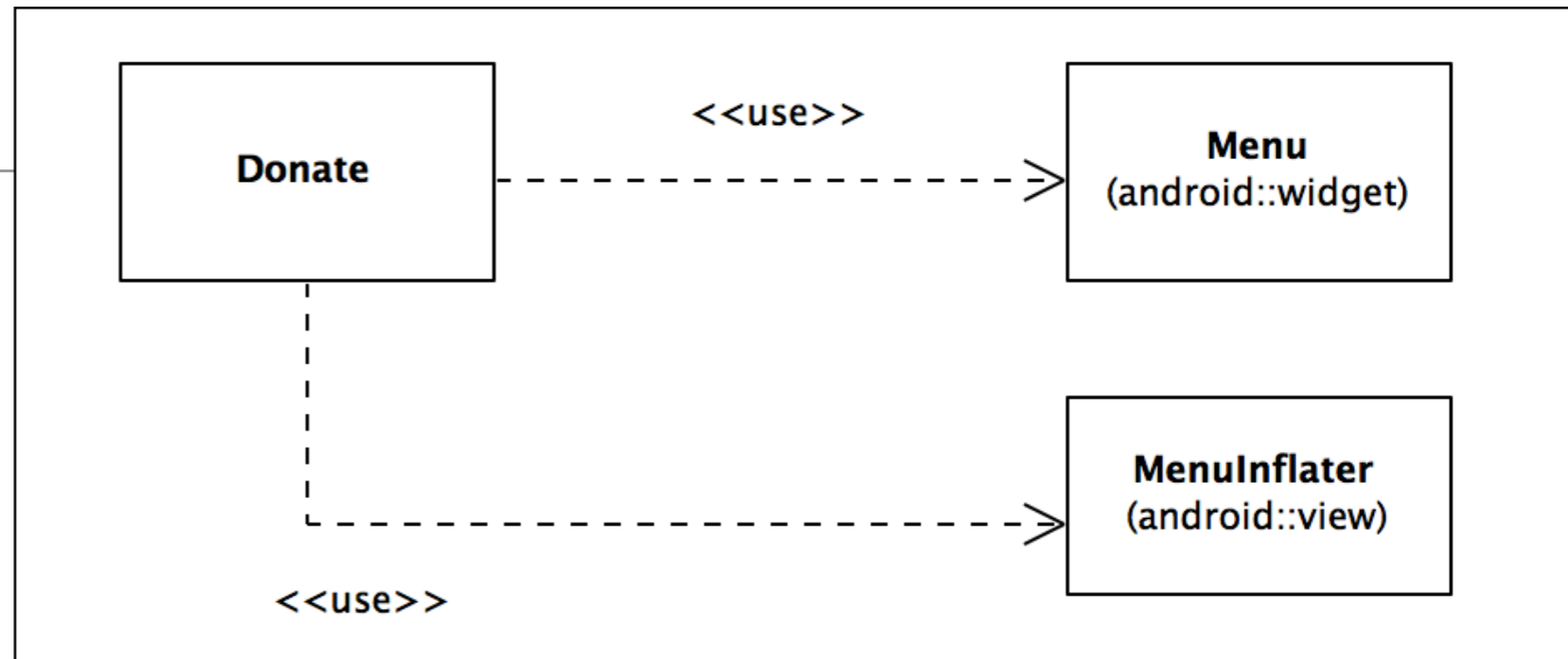
Association Models

- All three models are valid
- Which one we use depends on the level of detail we wish to communicate
- This is a judgement call, often based on the level of detail that is useful in a given diagram



Uses Relationship

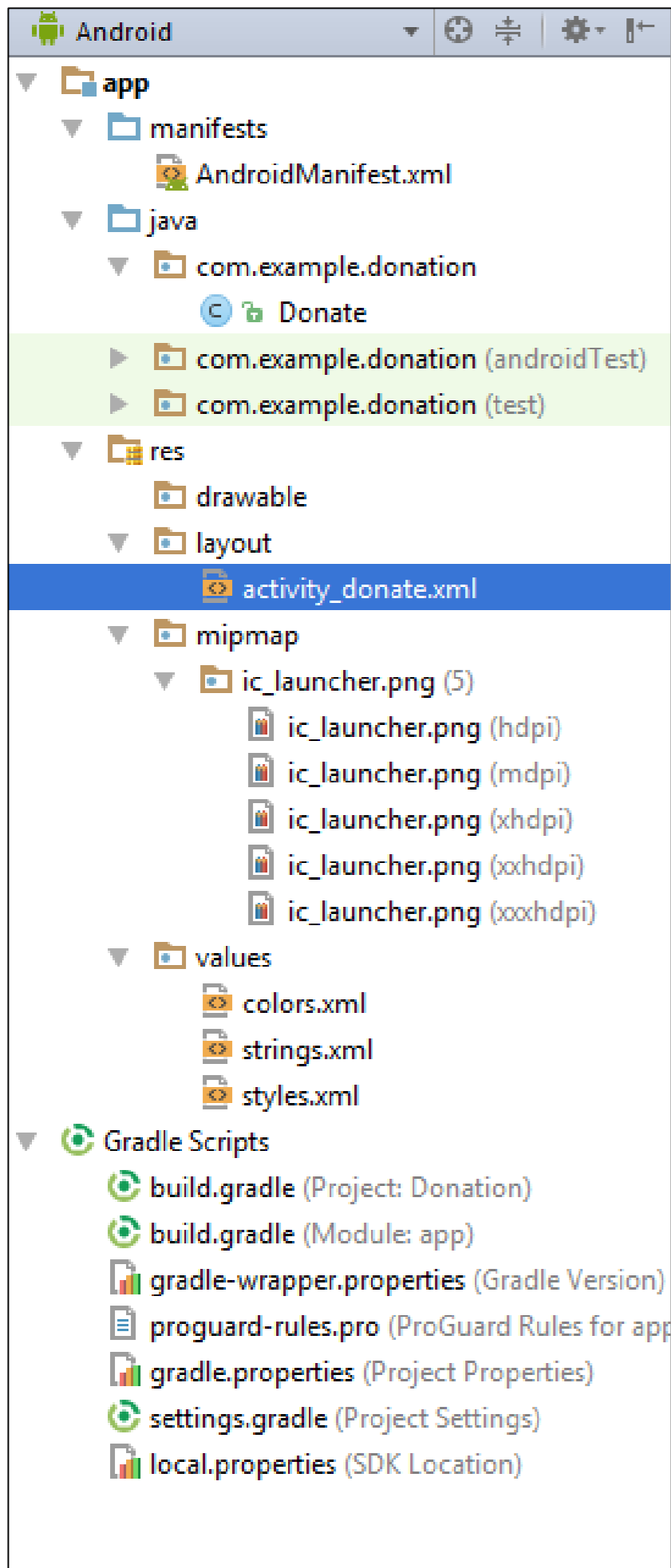
- Indicates that Donate 'uses' a Menu object.
- However, it will not retain a reference to the Menu object as a class member.



```
public class DonationApp extends Application
{
    ...
    @Override
    public boolean onCreateOptionsMenu(Menu menu)
    {
        getMenuInflater().inflate(R.menu.donate, menu);
        return true;
    } ...
}
```

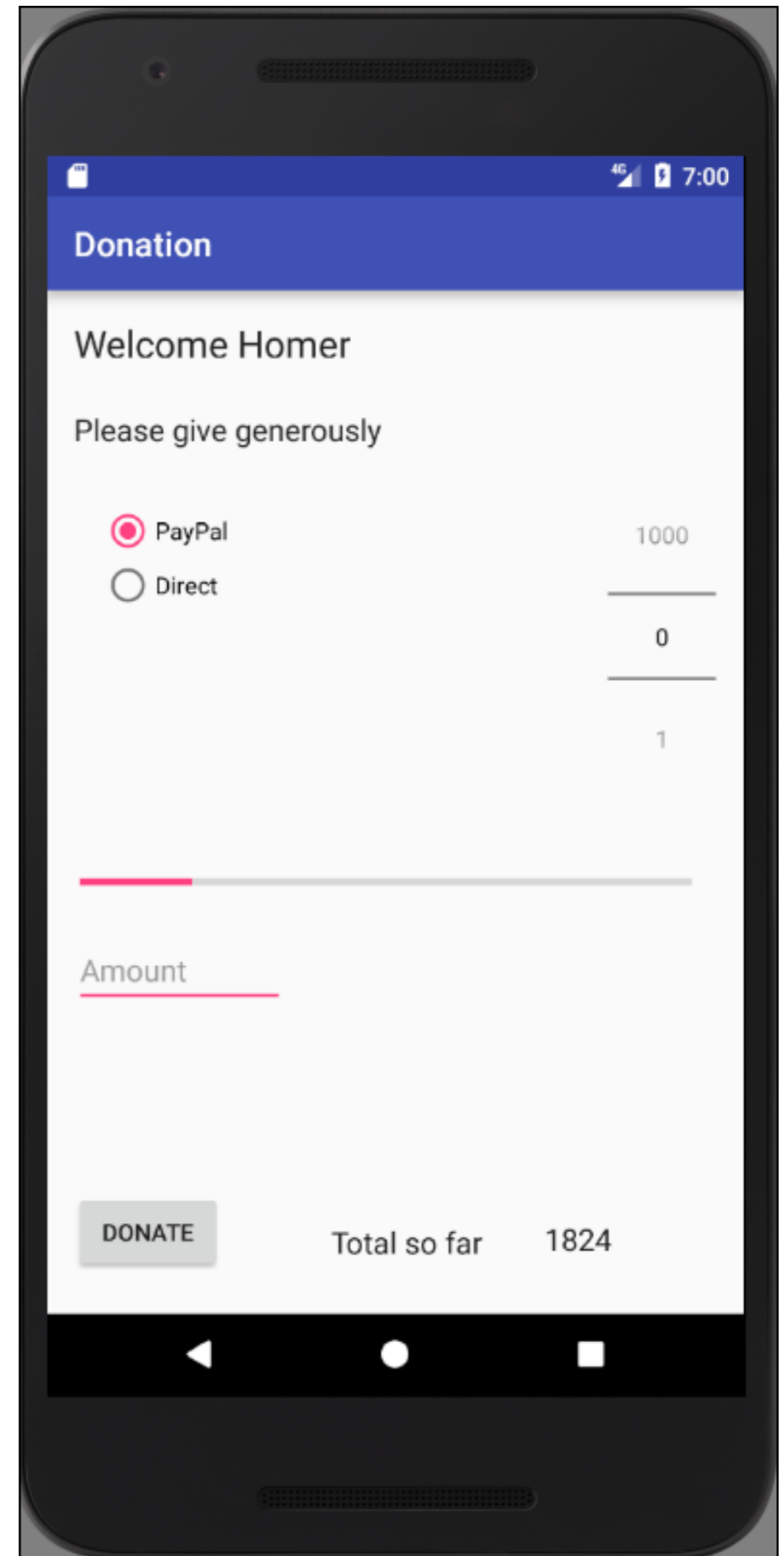
Donation App - Versions and their Models

- V1 - single activity, no model
- V2 - 2 activities + app + donation model
- V3 - 5 activities + app + user & donation model

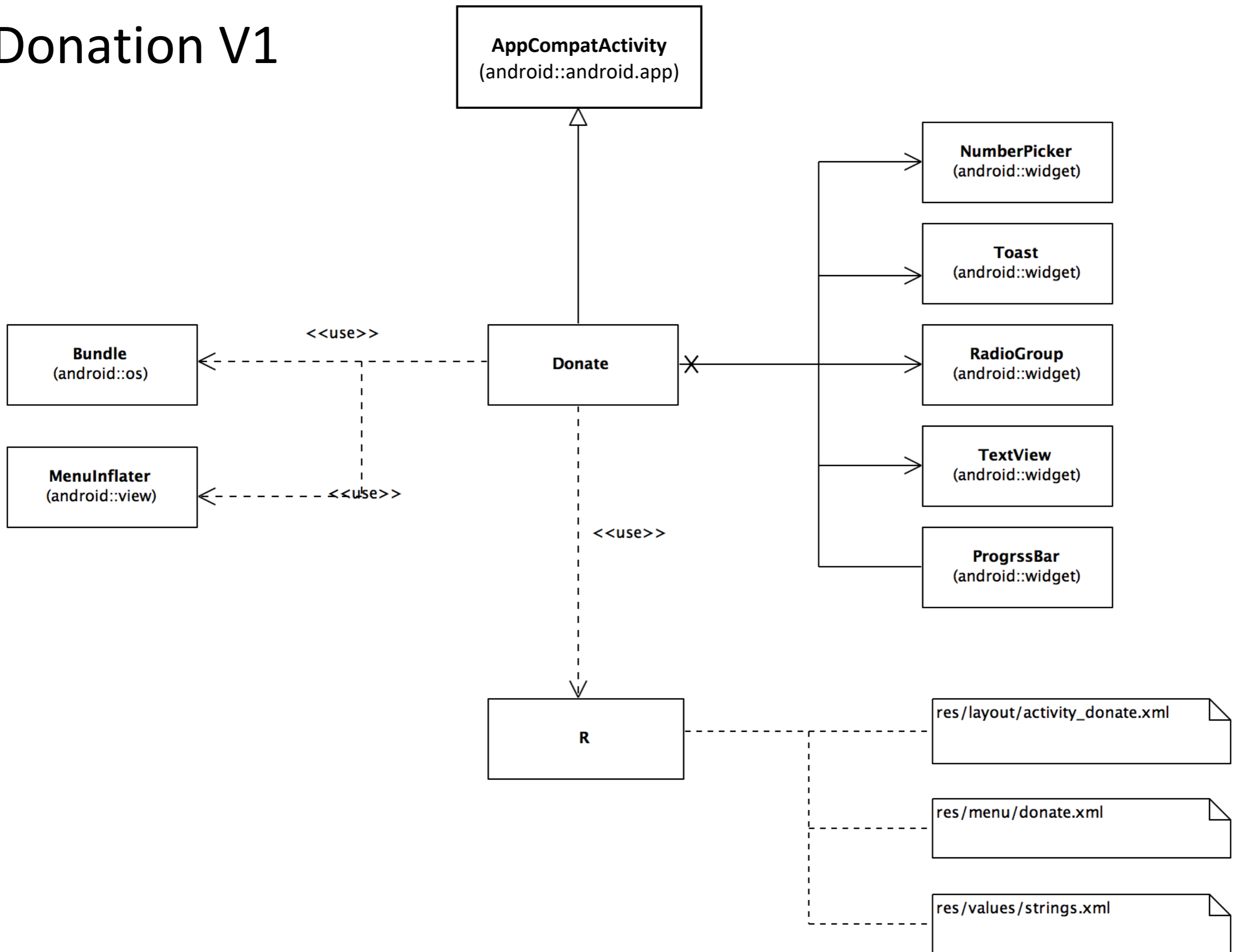


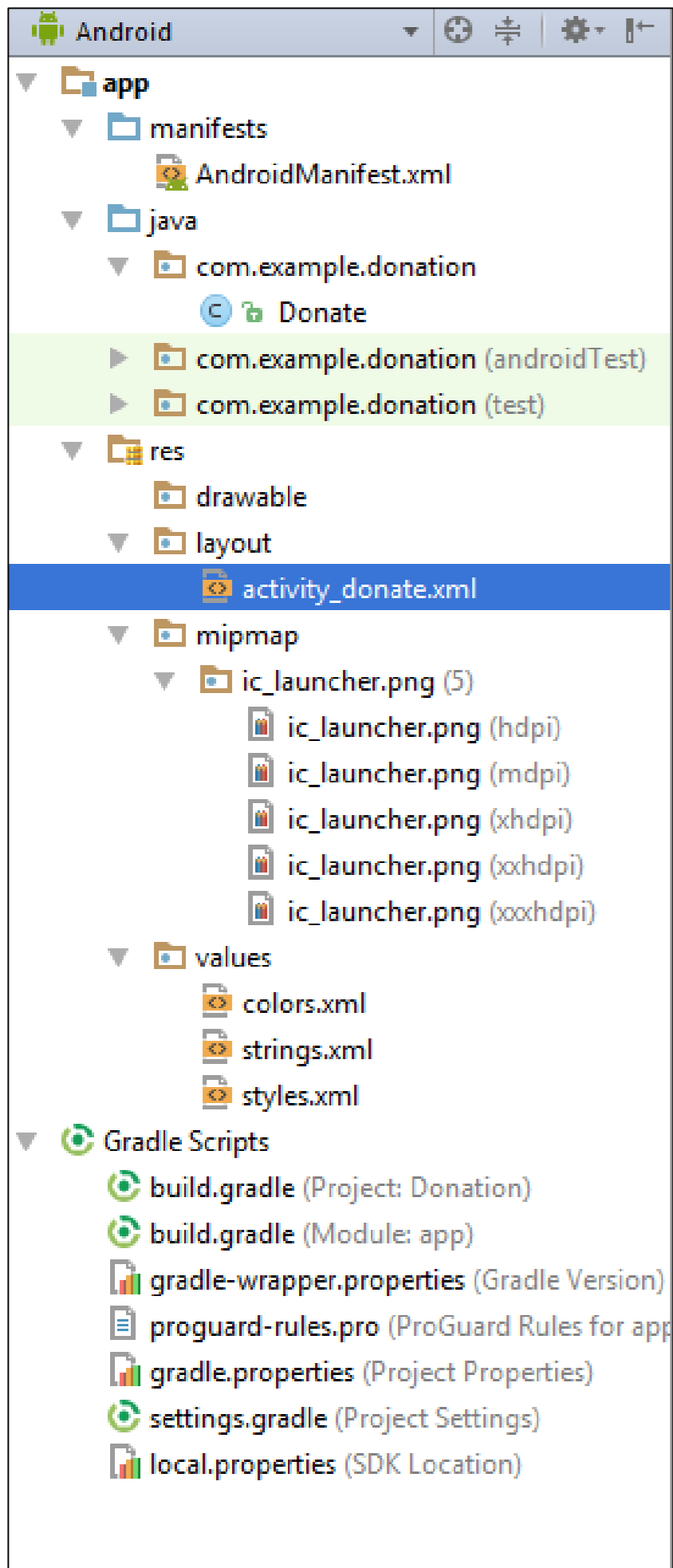
Donation V1

– single activity, no model

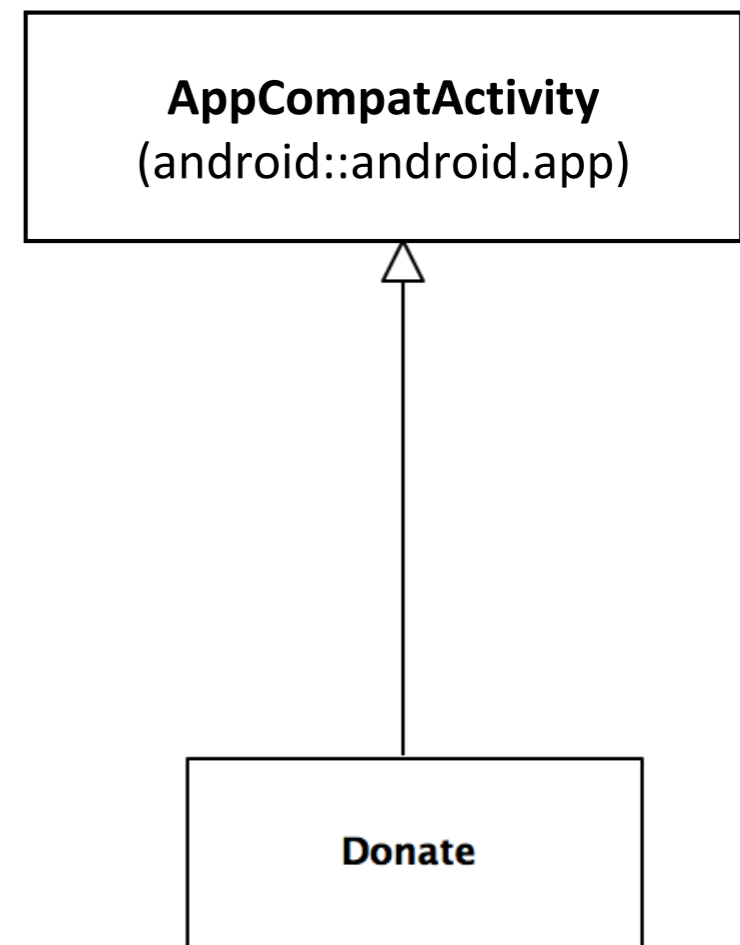


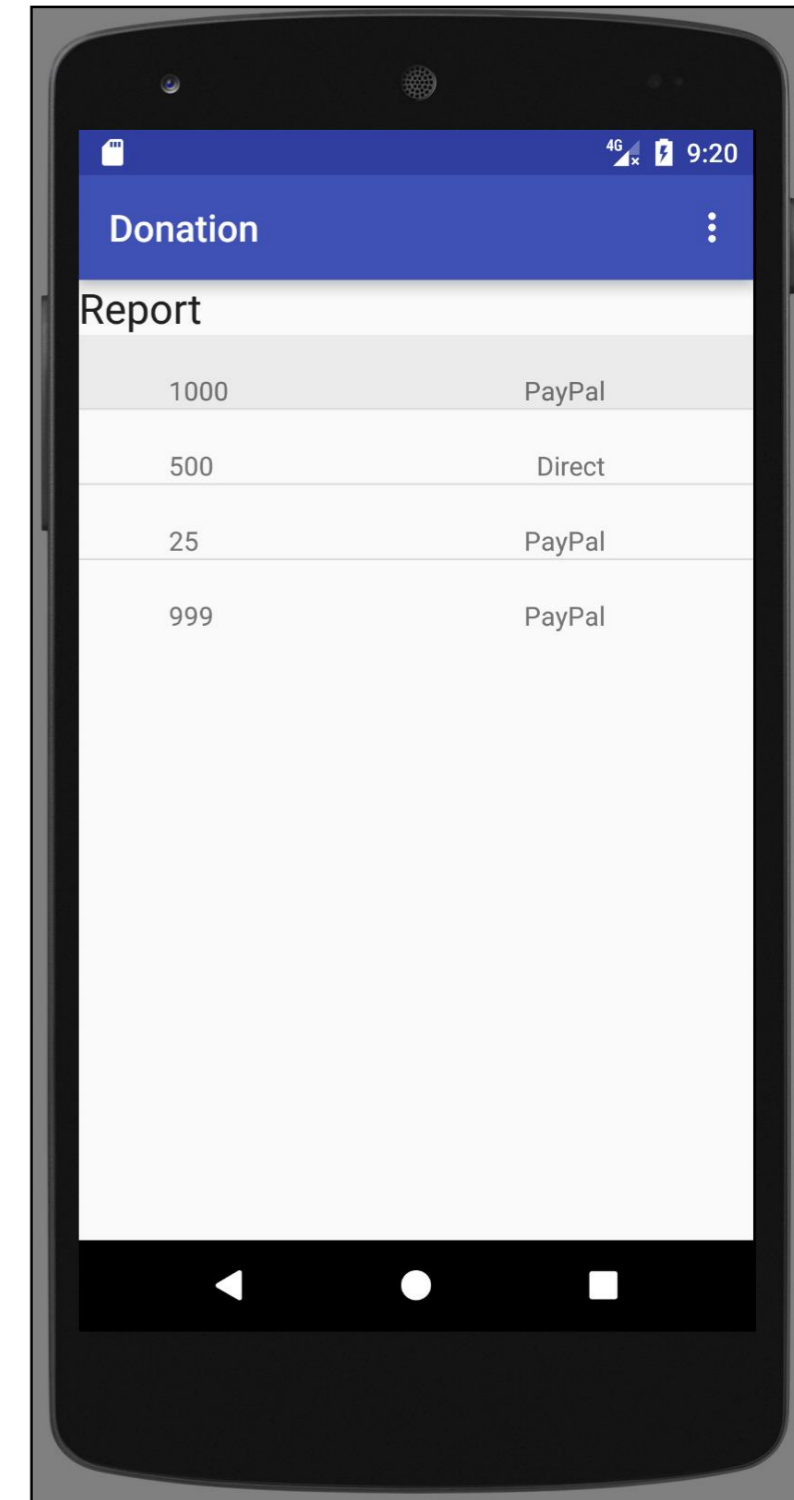
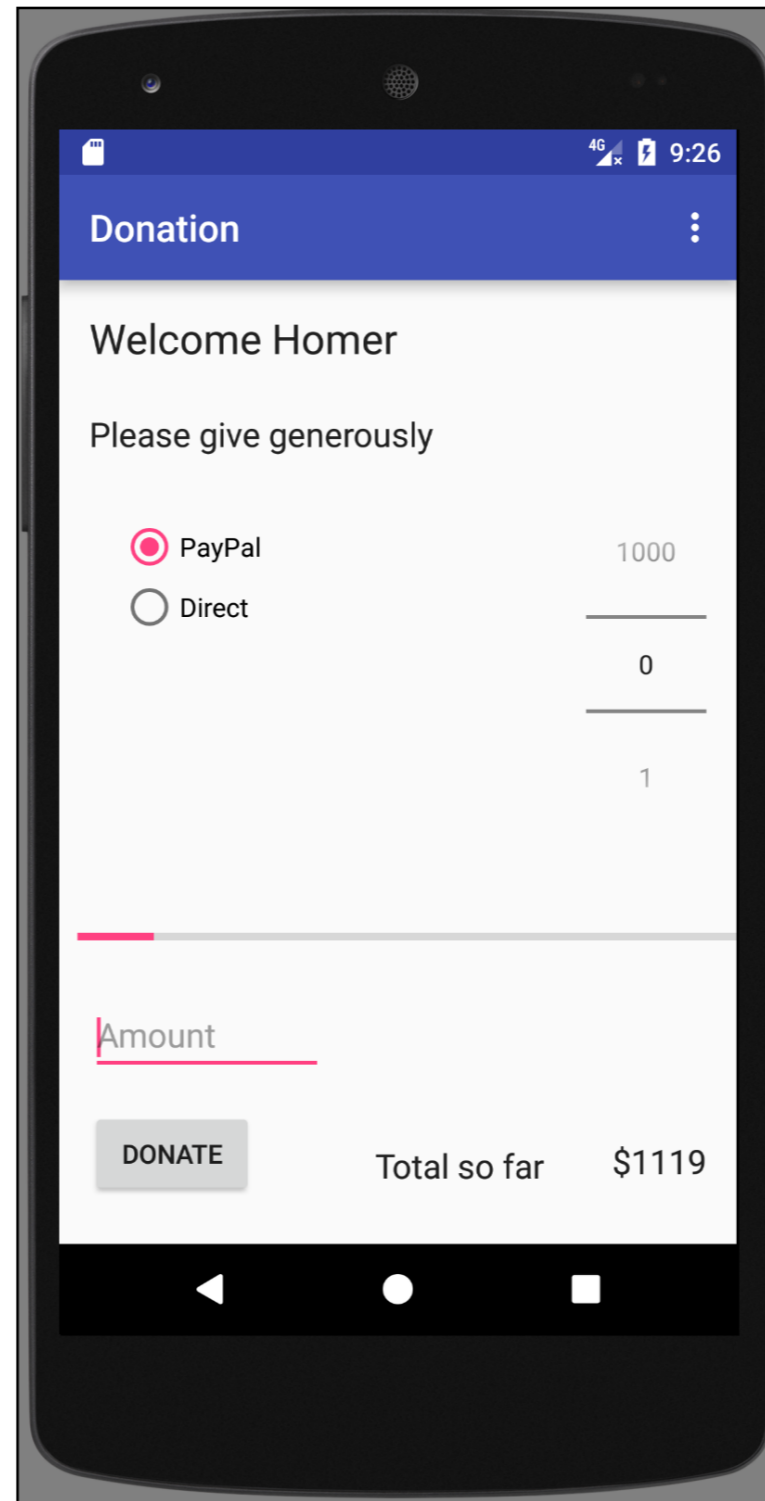
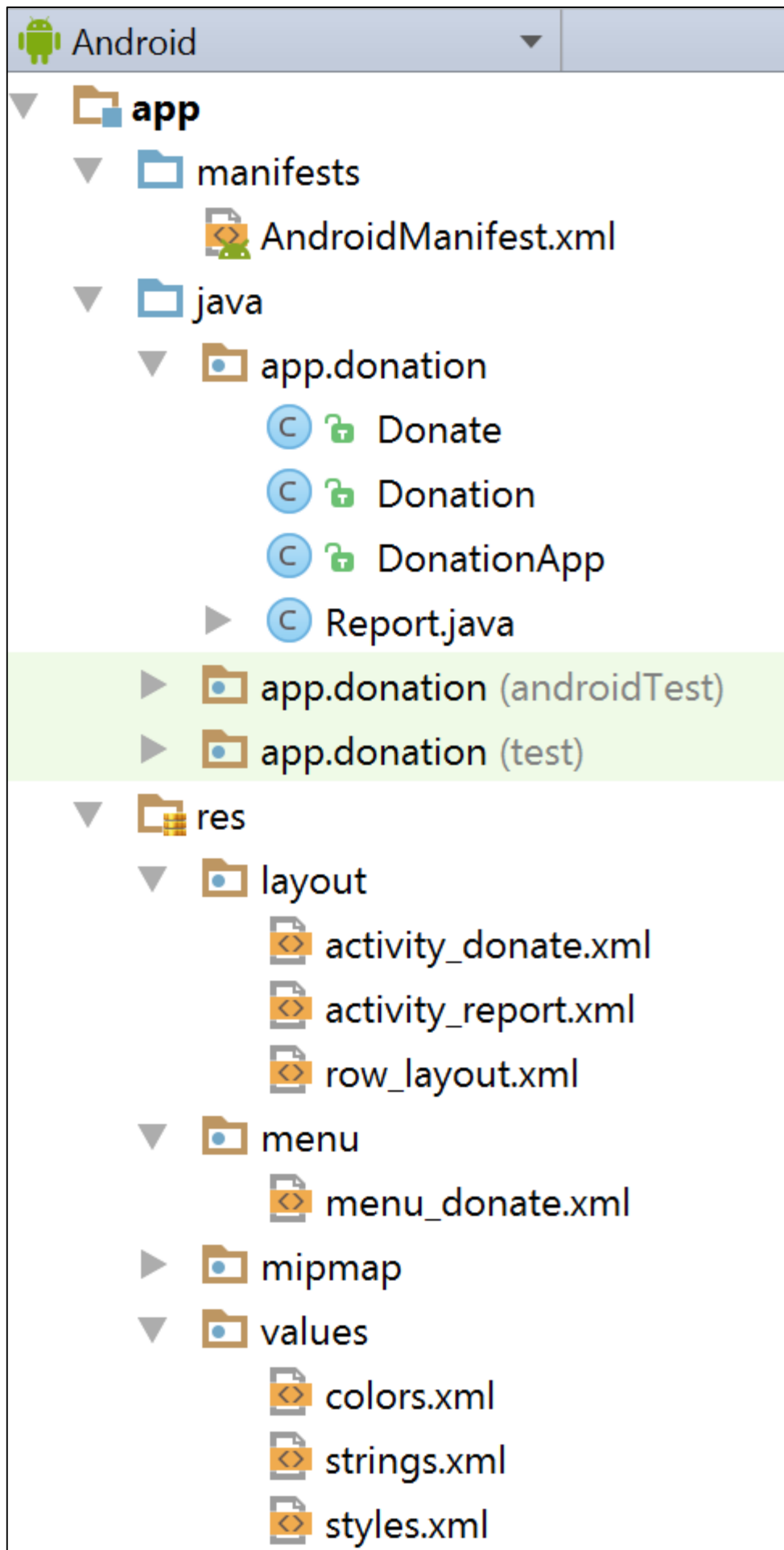
Donation V1





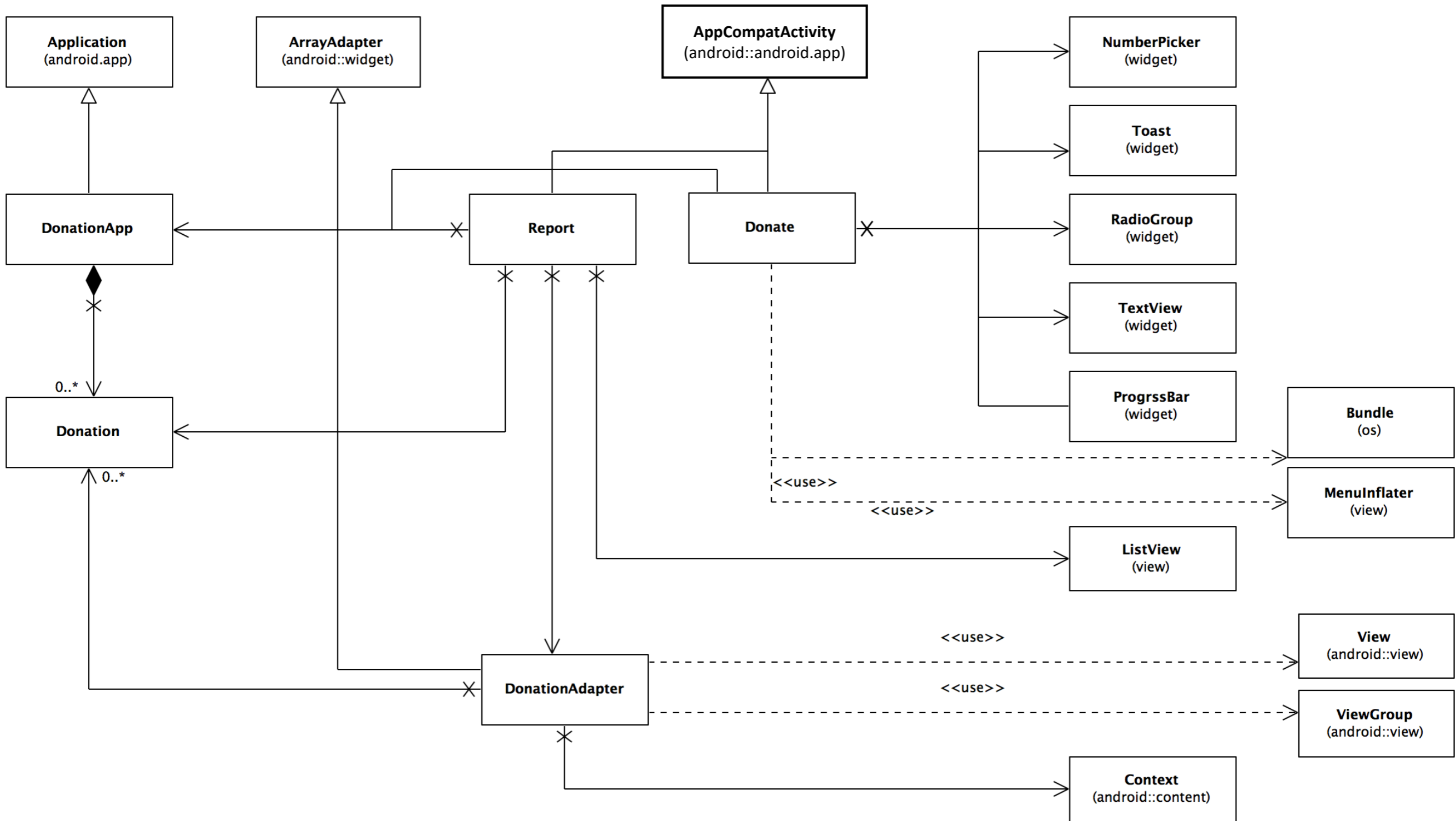
Donation V1 – simplified



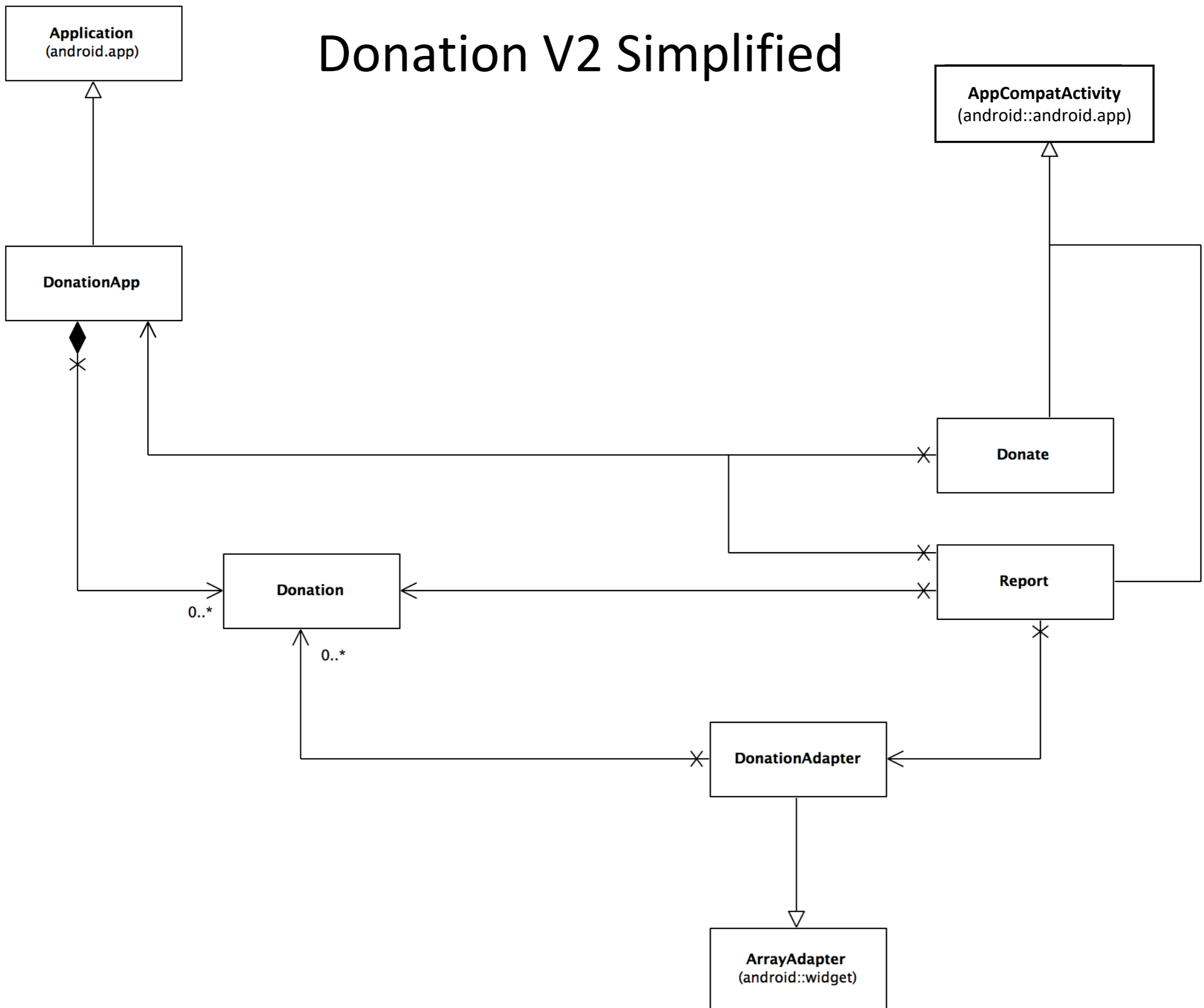


Donation V2 – two activities, app, donation model.

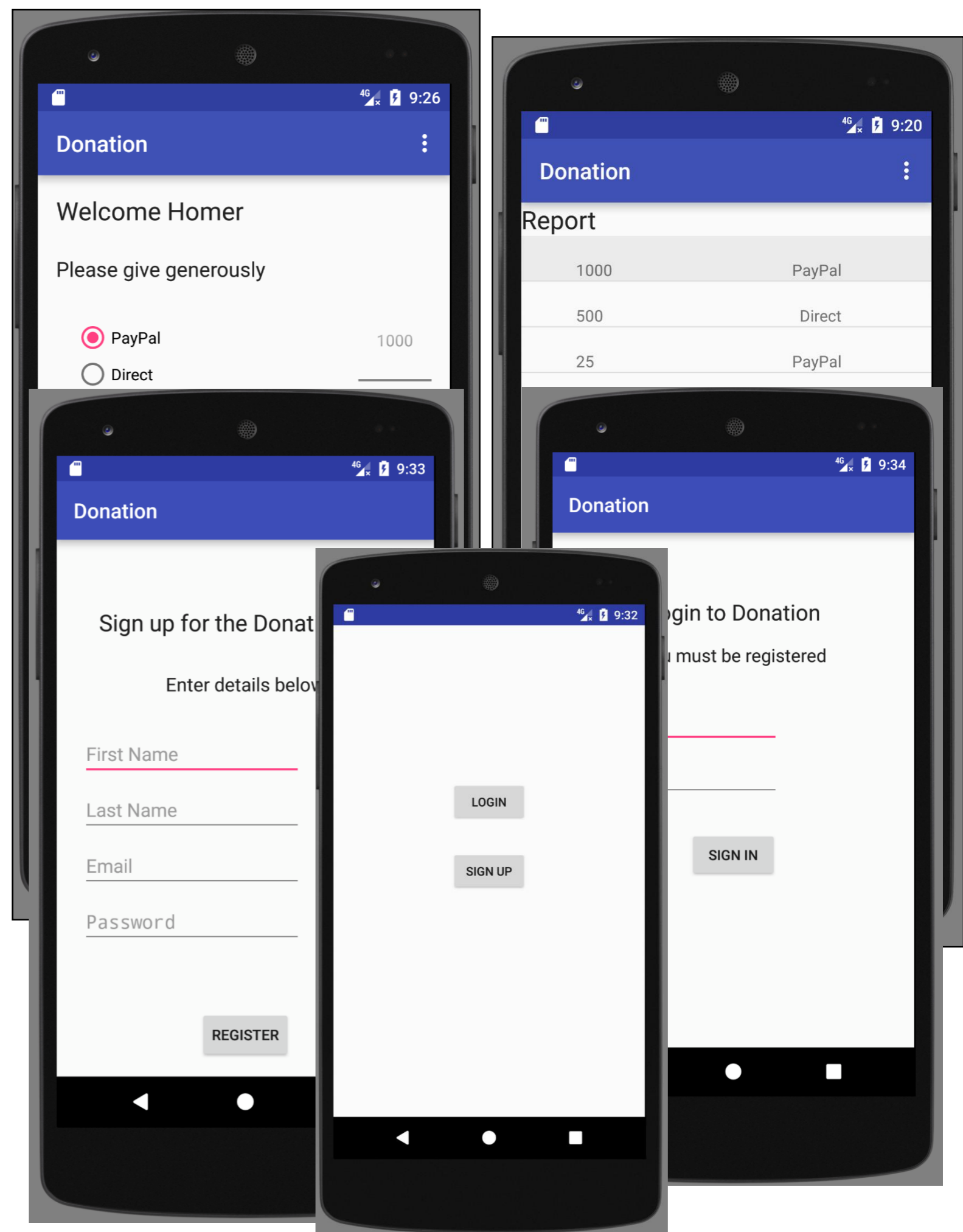
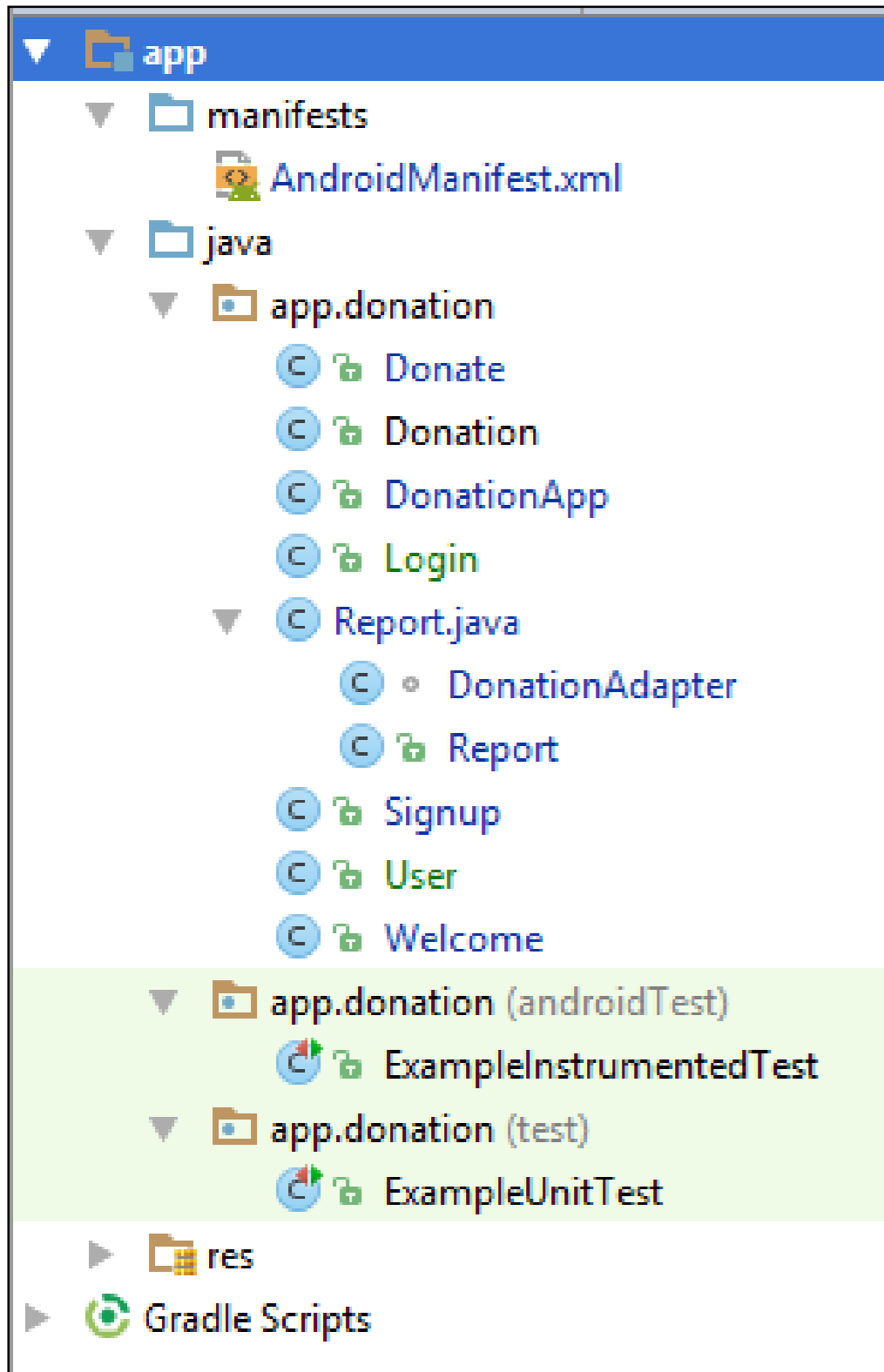
Donation V2



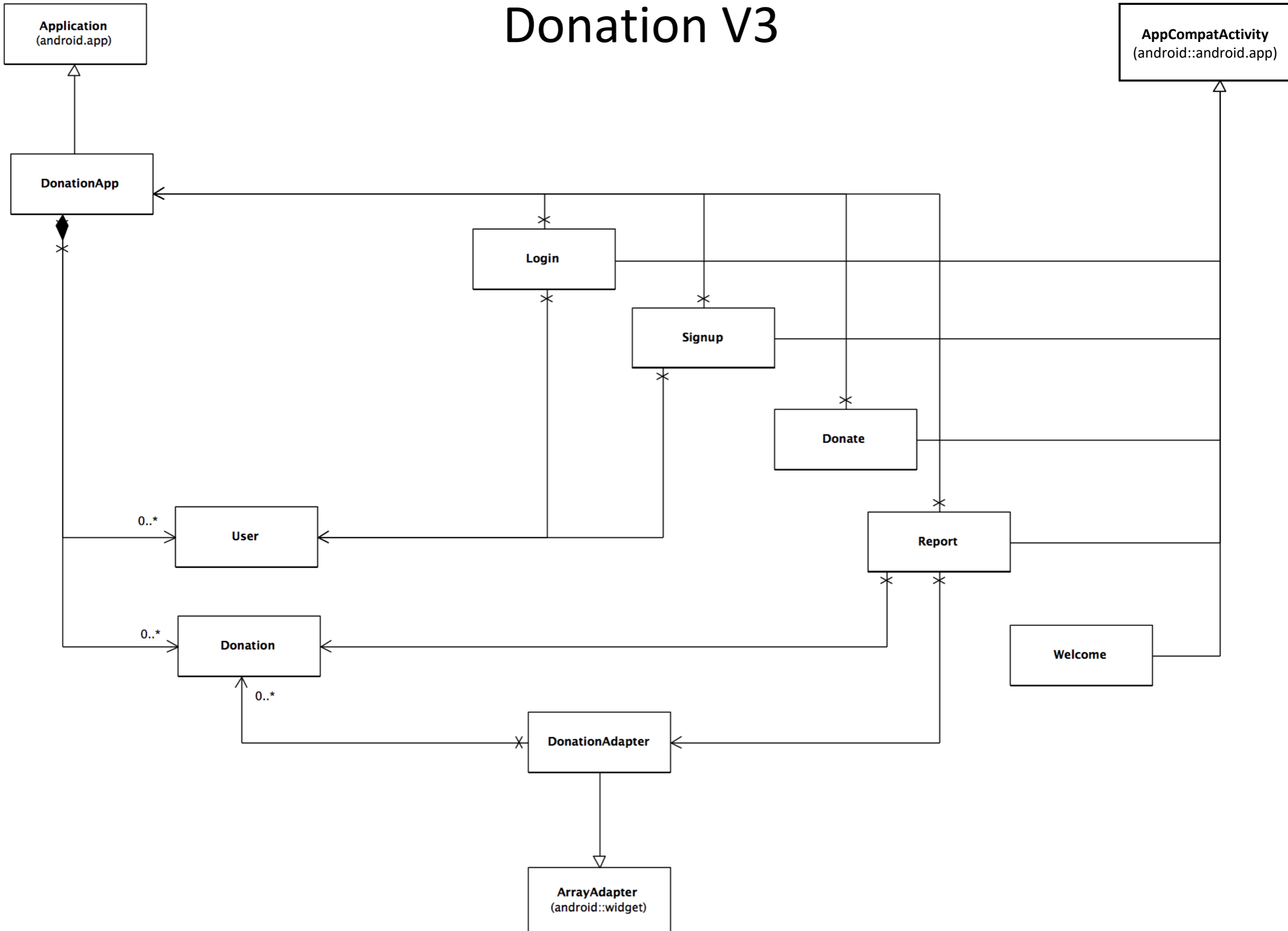
Donation V2 Simplified



Donation V3

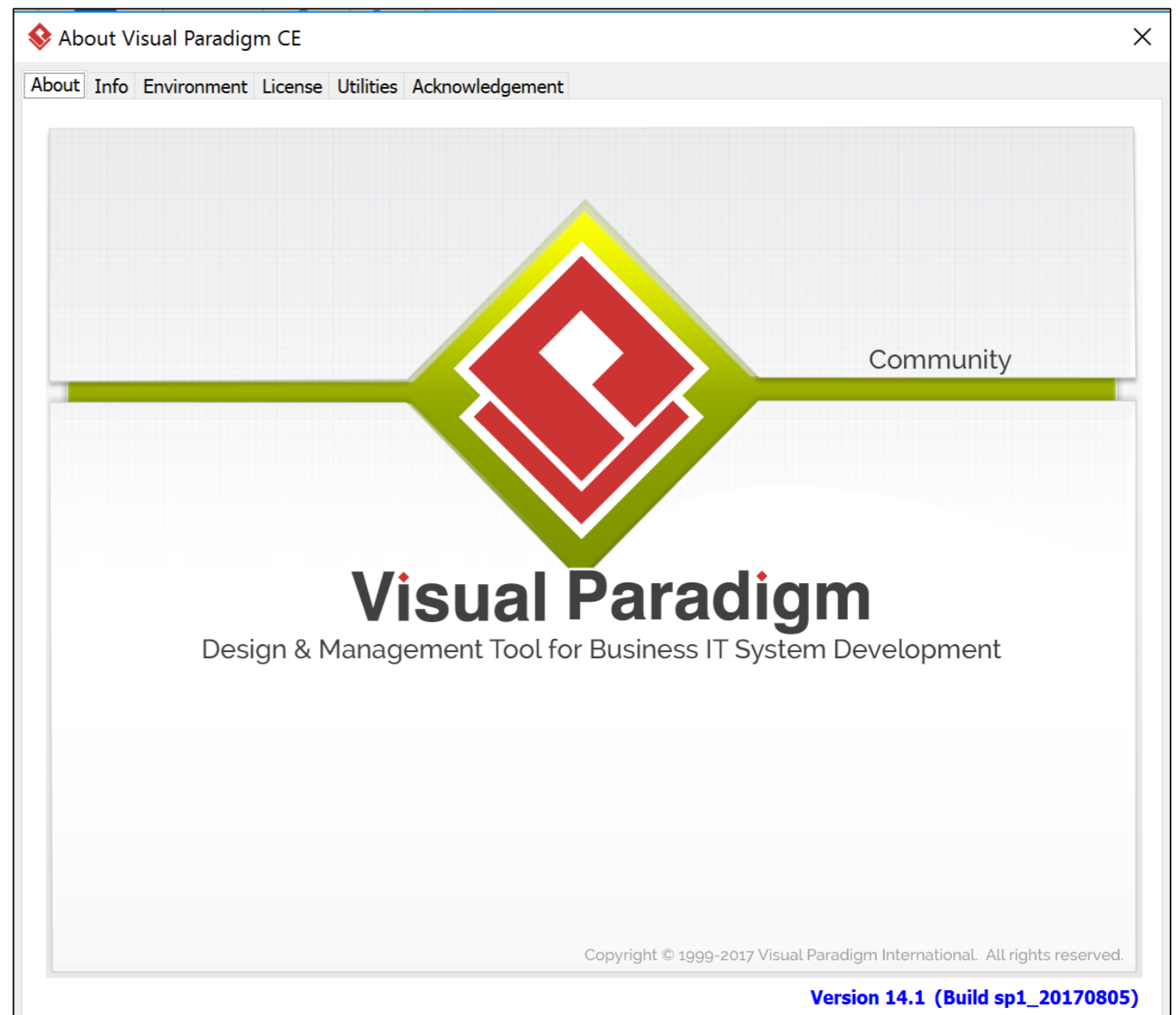


Donation V3



UML Tools

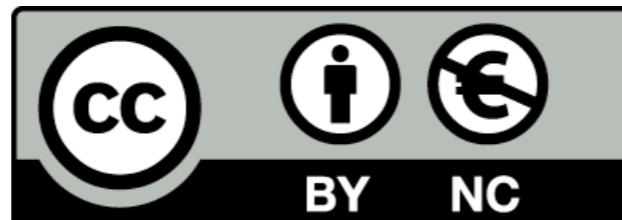
- All diagrams on these slides were designed using Visual Paradigm.
- Download the community edition (for non-commercial use only) for free.



<https://www.visual-paradigm.com/download/community.jsp>

Questions?





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