

**National University of Computer and Emerging Sciences, Lahore Campus**



<b>Course:</b>	<b>Software for Mobile Devices</b>	<b>Course Code:</b>	<b>CS-440</b>
<b>Program:</b>	<b>BS (Computer Science)</b>	<b>Semester:</b>	<b>Spring 2020</b>
<b>Duration:</b>	<b>90 Minutes</b>	<b>Total Marks:</b>	<b>30</b>
<b>Paper Date:</b>	<b>'21-Oct-20</b>	<b>Weight</b>	<b>12.5 %</b>
<b>Section:</b>	<b>A</b>	<b>Page(s):</b>	<b>4</b>
<b>Exam:</b>	<b>Midterm-I</b>	<b>Reg. No.</b>	

**Instruction/Notes:** This exam is open book and open notes.  
Please solve the exam on paper. You may use rough sheets but no need to attach.  
While writing code, make best effort to write correct and relevant code only. Minor syntactic errors are acceptable and will be ignored during marking but overall concept and approach must be correct.

**Question 1**

**(4+3+3=10 points)**

**Answer the following questions (in the space provided):**

**1. What issues need to be handled if the orientation of a device is changed at the runtime?**

Responsive UI design

State management

**2. What is the concept of layout and menu inflation?**

Layout inflation parses XML layout file and create View objects, whereas Menu inflation parses XML menu file and creates Menu objects.

**3. Contrast the memory management approach in Linux and Android.**

Android relies more on the Out-Of-Memory-Killer whereas other Linux-based OS relies on swap space.

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### Question 2

(20 points)



Suppose we want to use GridView to design a simple two-column layout for displaying alphabets (A-Z), as illustrated in the UI above. Each cell alternates among three colors (red, green and blue).

A basic code skeleton is given. Please fill-in the missing code sections to achieve the required layout. Make use of all the best practices required to handle scrolling of the contents considering re-cycling of views and the View Holder pattern.

#### Layout Files

activity\_main.xml

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <GridView
        android:id="@+id/grid"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:numColumns="2"
        android:horizontalSpacing="5px"
        android:verticalSpacing="5px"
    />
```

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```
</LinearLayout>
```

```
grid_cell.xml
```

```
<TextView xmlns:android=
    "http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="1in"
    android:gravity="center"
    android:textSize="24sp"
    >
</TextView>
```

### Source Code

```
public class MainActivity extends Activity {
    GridView grid;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        // specify any missing code below in the line
        grid = findViewById(R.id.grid)
        bind();
    }
    void bind(){
        String array[] = {"A", "B", "C", "D", "E", "F", "G", "H", "I", "J", "K",
            "L", "M", "N", "O", "P", "Q", "R", "S", "T", "U", "V", "W", "X", "Y", "Z"};
        // specify any missing code below in the line
        GridAdapter adapter = GridAdapter
        grid.setAdapter(adapter);
    }
}

public class GridAdapter extends ArrayAdapter {
    int[] colors = {0xFFFF0000, 0xFF00FF00, 0xFF0000FF}; // {red, green, blue}
    // TextView has setBackgroundColor function for changing color
```

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```
// continue writing code here

public GridAdapter(Context context, String[] data){
    super(context, 0, data);
}

public View getView(int position, @Nullable View convertView, @NonNull ViewGroup parent)
{
    if (convertView == null) {
        LayoutInflater inflater = (LayoutInflater)
            getContext().getSystemService(Context.LAYOUT_INFLATER_SERVICE);

        convertView = inflater.inflate(R.layout.grid_cell, parent, false);
    }

    TextView text = (TextView) convertView;
    text.setText((String) getItem(position));
    text.setBackgroundColor(colors[position % colors.length]);

    return convertView;
}
}
```