```objc
 1.  /**
 2.   *  PathsView.m
 3.   *  Section4App0
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "PathsView.h"
 9.
10.  @implementation PathsView
11.
12.  - (id)initWithFrame:(CGRect)frame
13.  {
14.      self = [super initWithFrame:frame];
15.      if (self) {
16.          // Initialization code
17.      }
18.      return self;
19.  }
20.
21.  - (void)drawRect:(CGRect)rect
22.  {
23.      // get context to draw to
24.      CGContextRef context = UIGraphicsGetCurrentContext();
25.
26.      // create path for horizontal line
27.      CGMutablePathRef linePath = CGPathCreateMutable();
28.      // start point
29.      CGPathMoveToPoint(linePath, NULL, 10.0f, 10.0f);
30.      // end point
31.      CGPathAddLineToPoint(linePath, NULL, 300.0f, 10.0f);
32.      CGPathCloseSubpath(linePath);
33.
34.      // create path for rectangle
35.      CGMutablePathRef rectPath = CGPathCreateMutable();
36.      // start at top left
37.      CGPathMoveToPoint(rectPath, NULL, 10.0f, 100.0f);
38.      // move from top left to bottom left
39.      CGPathAddLineToPoint(rectPath, NULL, 10.0f, 200.0f);
40.      // move from bottom left to bottom right
41.      CGPathAddLineToPoint(rectPath, NULL, 110.0f, 200.0f);
42.      // move from bottom right to top right
43.      CGPathAddLineToPoint(rectPath, NULL, 110.0f, 100.0f);
44.      CGPathCloseSubpath(rectPath);
45.
46.      // configure and draw line path
47.      CGContextSetLineWidth(context, 10.0f);
48.      CGContextAddPath(context, linePath);
```

```
49.        CGContextStrokePath(context);
50.
51.        // configure and draw rectangle path
52.        CGContextSetFillColorWithColor(context, [UIColor redColor].CGColor);
53.        CGContextAddPath(context, rectPath);
54.        CGContextFillPath(context);
55. }
56.
57. - (void)dealloc
58. {
59.        [super dealloc];
60. }
61.
62. @end
```

```
1.  /**
2.   *  Section4App0AppDelegate.m
3.   *  Section4App0
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App0AppDelegate.h"
9.  #import "Section4App0ViewController.h"
10.
11. @implementation Section4App0AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
     (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
     the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
     your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
     background.
```

```
45.        */
46.  }
47.
48.  - (void)applicationDidBecomeActive:(UIApplication *)application
49.  {
50.      /*
51.       Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
52.       */
53.  }
54.
55.  - (void)applicationWillTerminate:(UIApplication *)application
56.  {
57.      /*
58.       Called when the application is about to terminate.
59.       Save data if appropriate.
60.       See also applicationDidEnterBackground:.
61.       */
62.  }
63.
64.  - (void)dealloc
65.  {
66.      [_window release];
67.      [_viewController release];
68.      [super dealloc];
69.  }
70.
71.  @end
```

```objc
 1.  /**
 2.   *  Section4App0ViewController.m
 3.   *  Section4App0
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "Section4App0ViewController.h"
 9.
10.  @implementation Section4App0ViewController
11.
12.  - (void)dealloc
13.  {
14.      [super dealloc];
15.  }
16.
17.  - (void)didReceiveMemoryWarning
18.  {
19.      [super didReceiveMemoryWarning];
20.  }
21.
22.  #pragma mark - View lifecycle
23.
24.  - (void)viewDidLoad
25.  {
26.      [super viewDidLoad];
27.  }
28.
29.  - (void)viewDidUnload
30.  {
31.      [super viewDidUnload];
32.  }
33.
34.  - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
35.  {
36.      return (interfaceOrientation == UIInterfaceOrientationPortrait);
37.  }
38.
39.  @end
```

```
1.  /**
2.   *  main.m
3.   *  Section4App0
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. int main(int argc, char *argv[])
11. {
12.     NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.     int retVal = UIApplicationMain(argc, argv, nil, nil);
14.     [pool release];
15.     return retVal;
16. }
```

```objc
1.  /**
2.   *  Section4App1AppDelegate.m
3.   *  Section4App1
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App1AppDelegate.h"
9.  #import "Section4App1ViewController.h"
10.
11. @implementation Section4App1AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
```

```
45.        */
46.  }
47.
48.  - (void)applicationDidBecomeActive:(UIApplication *)application
49.  {
50.      /*
51.       Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
52.       */
53.  }
54.
55.  - (void)applicationWillTerminate:(UIApplication *)application
56.  {
57.      /*
58.       Called when the application is about to terminate.
59.       Save data if appropriate.
60.       See also applicationDidEnterBackground:.
61.       */
62.  }
63.
64.  - (void)dealloc
65.  {
66.      [_window release];
67.      [_viewController release];
68.      [super dealloc];
69.  }
70.
71.  @end
```

```objc
 1.  /**
 2.   *  Section4App1ViewController.m
 3.   *  Section4App1
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "Section4App1ViewController.h"
 9.
10.  @implementation Section4App1ViewController
11.
12.  - (void)dealloc
13.  {
14.      [super dealloc];
15.  }
16.
17.  - (void)didReceiveMemoryWarning
18.  {
19.      [super didReceiveMemoryWarning];
20.  }
21.
22.  #pragma mark - View lifecycle
23.
24.  - (void)viewDidLoad
25.  {
26.      [super viewDidLoad];
27.  }
28.
29.  - (void)viewDidUnload
30.  {
31.      [super viewDidUnload];
32.  }
33.
34.  - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
35.  {
36.      return (interfaceOrientation == UIInterfaceOrientationPortrait);
37.  }
38.
39.  @end
```

```
1.  /**
2.   *  ShadowView.m
3.   *  Section4App1
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "ShadowView.h"
9.
10. @implementation ShadowView
11.
12. - (id)initWithFrame:(CGRect)frame
13. {
14.     self = [super initWithFrame:frame];
15.     if (self) {
16.         // Initialization code
17.     }
18.     return self;
19. }
20.
21. - (void)drawRect:(CGRect)rect
22. {
23.     // get context to draw to
24.     CGContextRef context = UIGraphicsGetCurrentContext();
25.     // push state onto stack
26.     CGContextSaveGState(context);
27.
28.     // create path for triangle
29.     CGMutablePathRef path1 = CGPathCreateMutable();
30.     // start at top
31.     CGPathMoveToPoint(path1, NULL, 50.0f, 50.0f);
32.     // move to bottom left
33.     CGPathAddLineToPoint(path1, NULL, 10.0f, 90.0f);
34.     // move to bottom right
35.     CGPathAddLineToPoint(path1, NULL, 90.0f, 90.0f);
36.     CGPathCloseSubpath(path1);
37.
38.     // add shadow to triangle
39.     CGContextSetShadow(context, CGSizeMake(10.0f, 10.0f), 5.0f);
40.
41.     // draw triangle path
42.     CGContextAddPath(context, path1);
43.     CGContextSetFillColorWithColor(context, [UIColor greenColor].CGColor);
44.     CGContextFillPath(context);
45.
46.     // restore state (to before we added a shadow)
47.     CGContextRestoreGState(context);
48.
```

```
49.     // create another path for a second triangle
50.     CGMutablePathRef path2 = CGPathCreateMutable();
51.     // start at top
52.     CGPathMoveToPoint(path2, NULL, 250.0f, 250.0f);
53.     // move to bottom left
54.     CGPathAddLineToPoint(path2, NULL, 210.0f, 290.0f);
55.     // move to bottom right
56.     CGPathAddLineToPoint(path2, NULL, 290.0f, 290.0f);
57.     CGPathCloseSubpath(path2);
58.
59.     // draw second triangle path (without shadow)
60.     CGContextAddPath(context, path2);
61.     CGContextSetFillColorWithColor(context, [UIColor yellowColor].CGColor);
62.     CGContextFillPath(context);
63.
64. }
65.
66. - (void)dealloc
67. {
68.     [super dealloc];
69. }
70.
71. @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App1
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```objc
  1.  /**
  2.   *  GradientView.m
  3.   *  Section4App2
  4.   *  Tommy MacWilliam, 2011
  5.   *
  6.   */
  7.
  8.  #import "GradientView.h"
  9.
 10.  @implementation GradientView
 11.
 12.  - (id)initWithFrame:(CGRect)frame
 13.  {
 14.      self = [super initWithFrame:frame];
 15.      if (self) {
 16.          // Initialization code
 17.      }
 18.      return self;
 19.  }
 20.
 21.  - (void)drawRect:(CGRect)rect
 22.  {
 23.      // get context to draw to
 24.      CGContextRef context = UIGraphicsGetCurrentContext();
 25.
 26.      // gradient will have two components
 27.      CGFloat locations[] = { 0.0, 1.0 };
 28.      // set up colors (red, green, blue, alpha)
 29.      CGFloat components[] = { 1.0, 0.0, 0.0, 1.0, 0.0, 1.0, 0.0, 1.0 };
 30.      // create gradient
 31.      CGGradientRef gradient = CGGradientCreateWithColorComponents(CGColorSpaceCreateDeviceRGB(), components, locations, 2);
 32.
 33.      // draw linear gradient to screen
 34.      CGContextDrawLinearGradient(context, gradient, CGPointMake(0.0f, 0.0f), CGPointMake(100.0f, 100.0f), 0);
 35.
 36.      // draw radial gradient to screen
 37.      CGContextDrawRadialGradient(context, gradient, CGPointMake(150.0f, 150.0f), 10.0f,
 38.                                  CGPointMake(250.0f, 250.0f), 80.0f, 0);
 39.  }
 40.
 41.  - (void)dealloc
 42.  {
 43.      [super dealloc];
 44.  }
 45.
 46.  @end
```

```objc
1.  /**
2.   *  Section4App2AppDelegate.m
3.   *  Section4App2
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App2AppDelegate.h"
9.  #import "Section4App2ViewController.h"
10.
11. @implementation Section4App2AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
```

```
45.        */
46.  }
47.
48.  - (void)applicationDidBecomeActive:(UIApplication *)application
49.  {
50.      /*
51.        Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
      background, optionally refresh the user interface.
52.       */
53.  }
54.
55.  - (void)applicationWillTerminate:(UIApplication *)application
56.  {
57.      /*
58.       Called when the application is about to terminate.
59.       Save data if appropriate.
60.       See also applicationDidEnterBackground:.
61.       */
62.  }
63.
64.  - (void)dealloc
65.  {
66.      [_window release];
67.      [_viewController release];
68.      [super dealloc];
69.  }
70.
71.  @end
```

```
1.  /**
2.   *  Section4App2ViewController.m
3.   *  Section4App2
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App2ViewController.h"
9.
10. @implementation Section4App2ViewController
11.
12. - (void)dealloc
13. {
14.     [super dealloc];
15. }
16.
17. - (void)didReceiveMemoryWarning
18. {
19.     [super didReceiveMemoryWarning];
20. }
21.
22. #pragma mark - View lifecycle
23.
24. - (void)viewDidLoad
25. {
26.     [super viewDidLoad];
27. }
28.
29. - (void)viewDidUnload
30. {
31.     [super viewDidUnload];
32. }
33.
34. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
35. {
36.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
37. }
38.
39. @end
```

```
 1.  /**
 2.   *  main.m
 3.   *  Section4App2
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```objectivec
 1.  /**
 2.   *  CustomCell.m
 3.   *  Section4App3
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "CustomCell.h"
 9.
10.  @implementation CustomCell
11.
12.  - (id)initWithFrame:(CGRect)frame
13.  {
14.      self = [super initWithFrame:frame];
15.      if (self) {
16.          // Initialization code
17.      }
18.      return self;
19.  }
20.
21.  - (void)drawRect:(CGRect)rect
22.  {
23.      // get canvas to draw on
24.      CGContextRef context = UIGraphicsGetCurrentContext();
25.
26.      // create new color to fill cell with
27.      CGColorRef color = [UIColor colorWithRed:1.0 green:0.0 blue:0.0 alpha:1.0].CGColor;
28.
29.      // set color to our new color and fill cell
30.      CGContextSetFillColorWithColor(context, color);
31.      CGContextFillRect(context, self.bounds);
32.  }
33.
34.  - (void)dealloc
35.  {
36.      [super dealloc];
37.  }
38.
39.  @end
```

```objc
 1.  /**
 2.   *  RootViewController.m
 3.   *  Section4App3
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "RootViewController.h"
 9.  #import "CustomCell.h"
10.
11.  @implementation RootViewController
12.
13.  @synthesize fruits=_fruits;
14.
15.  - (void)viewDidLoad
16.  {
17.      [super viewDidLoad];
18.      self.navigationItem.title = @"Fruits";
19.
20.      // load plist
21.      self.fruits = [[NSMutableArray alloc] initWithContentsOfFile:
22.                      [[NSBundle mainBundle] pathForResource:@"Fruits" ofType:@"plist"]];
23.  }
24.
25.  - (void)viewWillAppear:(BOOL)animated
26.  {
27.      [super viewWillAppear:animated];
28.  }
29.
30.  - (void)viewDidAppear:(BOOL)animated
31.  {
32.      [super viewDidAppear:animated];
33.  }
34.
35.  - (void)viewWillDisappear:(BOOL)animated
36.  {
37.      [super viewWillDisappear:animated];
38.  }
39.
40.  - (void)viewDidDisappear:(BOOL)animated
41.  {
42.      [super viewDidDisappear:animated];
43.  }
44.
45.  - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation {
46.      return (interfaceOrientation == UIInterfaceOrientationPortrait);
47.  }
48.
```

```
49.   - (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
50.   {
51.       return 1;
52.   }
53.
54.   - (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
55.   {
56.       return [self.fruits count];
57.   }
58.
59.   - (UITableViewCell *)tableView:(UITableView *)tableView cellForRowAtIndexPath:(NSIndexPath *)indexPath
60.   {
61.       static NSString *CellIdentifier = @"Cell";
62.
63.       UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:CellIdentifier];
64.       if (cell == nil) {
65.           cell = [[[UITableViewCell alloc] initWithStyle:UITableViewCellStyleDefault reuseIdentifier:CellIdentifier] autorelease];
66.
67.           // create new instance of our custom UIView
68.           cell.backgroundView = [[[CustomCell alloc] init] autorelease];
69.       }
70.
71.       // set cell label to fruit text
72.       cell.textLabel.text = [self.fruits objectAtIndex:indexPath.row];
73.
74.       // make sure default background color doesn't cover our custom view
75.       cell.textLabel.backgroundColor = [UIColor clearColor];
76.       cell.selectionStyle = UITableViewCellSelectionStyleNone;
77.
78.       return cell;
79.   }
80.
81.   - (void)didReceiveMemoryWarning
82.   {
83.       [super didReceiveMemoryWarning];
84.   }
85.
86.   - (void)viewDidUnload
87.   {
88.       [super viewDidUnload];
89.   }
90.
91.   - (void)dealloc
92.   {
93.       [super dealloc];
94.   }
95.
96.   @end
```

```objc
1.  /**
2.   *  Section4App3AppDelegate.m
3.   *  Section4App3
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App3AppDelegate.h"
9.
10. @implementation Section4App3AppDelegate
11.
12. @synthesize window=_window;
13. @synthesize navigationController=_navigationController;
14.
15. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
16. {
17.     // Override point for customization after application launch.
18.     // Add the navigation controller's view to the window and display.
19.     self.window.rootViewController = self.navigationController;
20.     [self.window makeKeyAndVisible];
21.     return YES;
22. }
23.
24. - (void)applicationWillResignActive:(UIApplication *)application
25. {
26.     /*
27.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
28.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
29.      */
30. }
31.
32. - (void)applicationDidEnterBackground:(UIApplication *)application
33. {
34.     /*
35.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
36.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
37.      */
38. }
39.
40. - (void)applicationWillEnterForeground:(UIApplication *)application
41. {
42.     /*
43.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
44.      */
```

```
45.  }
46.
47.  - (void)applicationDidBecomeActive:(UIApplication *)application
48.  {
49.      /*
50.       Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
51.      */
52.  }
53.
54.  - (void)applicationWillTerminate:(UIApplication *)application
55.  {
56.      /*
57.       Called when the application is about to terminate.
58.       Save data if appropriate.
59.       See also applicationDidEnterBackground:.
60.      */
61.  }
62.
63.  - (void)dealloc
64.  {
65.      [_window release];
66.      [_navigationController release];
67.      [super dealloc];
68.  }
69.
70.  @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App3
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```objc
 1.  /**
 2.   *  CustomButton.m
 3.   *  Section4App4
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "CustomButton.h"
 9.
10.  @implementation CustomButton
11.
12.  - (id)initWithFrame:(CGRect)frame title:(NSString *)title color:(UIColor *)color
13.  {
14.      self = [super initWithFrame:frame];
15.      if (self) {
16.          [self setTitle:title forState:UIControlStateNormal];
17.          [self setTitleColor:color forState:UIControlStateNormal];
18.      }
19.      return self;
20.  }
21.
22.  - (void)drawRect:(CGRect)rect
23.  {
24.      // get context to draw to
25.      CGContextRef context = UIGraphicsGetCurrentContext();
26.
27.      // gradient will have two components
28.      CGFloat locations[] = { 0.0, 1.0 };
29.      // set up colors (red, green, blue, alpha)
30.      CGFloat components[] = { 1.0, 0.0, 0.0, 1.0, 0.0, 1.0, 0.0, 1.0 };
31.      // create gradient
32.      CGGradientRef gradient = CGGradientCreateWithColorComponents(CGColorSpaceCreateDeviceRGB(), components, locations, 2);
33.
34.      // draw linear gradient to screen
35.      CGContextDrawLinearGradient(context, gradient, CGPointMake(self.bounds.origin.x, self.bounds.origin.y),
36.                              CGPointMake(self.bounds.size.width, self.bounds.size.height), 0);
37.  }
38.
39.  - (void)dealloc
40.  {
41.      [super dealloc];
42.  }
43.
44.  @end
```

```
1.   /**
2.    *   Section4App4AppDelegate.m
3.    *   Section4App4
4.    *   Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import "Section4App4AppDelegate.h"
9.   #import "Section4App4ViewController.h"
10.
11.  @implementation Section4App4AppDelegate
12.
13.  @synthesize window=_window;
14.  @synthesize viewController=_viewController;
15.
16.  - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17.  {
18.      // Override point for customization after application launch.
19.
20.      self.window.rootViewController = self.viewController;
21.      [self.window makeKeyAndVisible];
22.      return YES;
23.  }
24.
25.  - (void)applicationWillResignActive:(UIApplication *)application
26.  {
27.      /*
28.       Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
     (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.       Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
     the game.
30.       */
31.  }
32.
33.  - (void)applicationDidEnterBackground:(UIApplication *)application
34.  {
35.      /*
36.       Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
     your application to its current state in case it is terminated later.
37.       If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.       */
39.  }
40.
41.  - (void)applicationWillEnterForeground:(UIApplication *)application
42.  {
43.      /*
44.       Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
     background.
```

```
45.        */
46.  }
47.
48.  - (void)applicationDidBecomeActive:(UIApplication *)application
49.  {
50.      /*
51.       Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
52.       */
53.  }
54.
55.  - (void)applicationWillTerminate:(UIApplication *)application
56.  {
57.      /*
58.       Called when the application is about to terminate.
59.       Save data if appropriate.
60.       See also applicationDidEnterBackground:.
61.       */
62.  }
63.
64.  - (void)dealloc
65.  {
66.      [_window release];
67.      [_viewController release];
68.      [super dealloc];
69.  }
70.
71.  @end
```

```objc
1.  /**
2.   *  Section4App4ViewController.m
3.   *  Section4App4
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App4ViewController.h"
9.  #import "CustomButton.h"
10.
11. @implementation Section4App4ViewController
12.
13. - (void)dealloc
14. {
15.     [super dealloc];
16. }
17.
18. - (void)didReceiveMemoryWarning
19. {
20.     [super didReceiveMemoryWarning];
21. }
22.
23. #pragma mark - View lifecycle
24.
25. - (void)viewDidLoad
26. {
27.     [super viewDidLoad];
28.
29.     // create new custom button
30.     CustomButton *button = [[CustomButton alloc] initWithFrame:CGRectMake(50.0f, 50.0f, 100.0f, 50.0f)
31.                                                          title:@"Button" color:[UIColor blueColor]];
32.
33.     // add event handler to button
34.     [button addTarget:self action:@selector(pressed:) forControlEvents:UIControlEventTouchUpInside];
35.
36.     // add button to view
37.     [self.view addSubview:button];
38.     [button release];
39. }
40.
41. - (void)viewDidUnload
42. {
43.     [super viewDidUnload];
44. }
45.
46. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
47. {
48.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
```

```
49.  }
50.
51.  - (void)pressed:(id)sender
52.  {
53.      UIAlertView *alert = [[UIAlertView alloc] initWithTitle:@"Press" message:@"You sure did!" delegate:nil
54.                                        cancelButtonTitle:@"Thanks" otherButtonTitles:nil];
55.      [alert show];
56.      [alert release];
57.  }
58.
59.  @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App4
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```
 1.  /**
 2.   *  Section4App5AppDelegate.m
 3.   *  Section4App5
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import "Section4App5AppDelegate.h"
 9.  #import "Section4App5ViewController.h"
10.
11.  @implementation Section4App5AppDelegate
12.
13.  @synthesize window=_window;
14.  @synthesize viewController=_viewController;
15.
16.  - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17.  {
18.      // Override point for customization after application launch.
19.
20.      self.window.rootViewController = self.viewController;
21.      [self.window makeKeyAndVisible];
22.      return YES;
23.  }
24.
25.  - (void)applicationWillResignActive:(UIApplication *)application
26.  {
27.      /*
28.       Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.       Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
30.       */
31.  }
32.
33.  - (void)applicationDidEnterBackground:(UIApplication *)application
34.  {
35.      /*
36.       Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
37.       If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.       */
39.  }
40.
41.  - (void)applicationWillEnterForeground:(UIApplication *)application
42.  {
43.      /*
44.       Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
```

```
45.        */
46. }
47.
48. - (void)applicationDidBecomeActive:(UIApplication *)application
49. {
50.     /*
51.      Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
    background, optionally refresh the user interface.
52.      */
53. }
54.
55. - (void)applicationWillTerminate:(UIApplication *)application
56. {
57.     /*
58.      Called when the application is about to terminate.
59.      Save data if appropriate.
60.      See also applicationDidEnterBackground:.
61.      */
62. }
63.
64. - (void)dealloc
65. {
66.     [_window release];
67.     [_viewController release];
68.     [super dealloc];
69. }
70.
71. @end
```

```objc
  1.  /**
  2.   *  Section4App5ViewController.m
  3.   *  Section4App5
  4.   *  Tommy MacWilliam, 2011
  5.   *
  6.   */
  7.
  8.  #import "Section4App5ViewController.h"
  9.
 10.  @implementation Section4App5ViewController
 11.
 12.  @synthesize imageView=_imageView, picker=_picker;
 13.
 14.  - (void)dealloc
 15.  {
 16.      // release ivars
 17.      [_imageView release];
 18.      [_picker release];
 19.
 20.      [super dealloc];
 21.  }
 22.
 23.  - (void)didReceiveMemoryWarning
 24.  {
 25.      [super didReceiveMemoryWarning];
 26.  }
 27.
 28.  #pragma mark - View lifecycle
 29.
 30.  - (void)viewDidLoad
 31.  {
 32.      [super viewDidLoad];
 33.
 34.      // initialize image picker
 35.      self.picker = [[UIImagePickerController alloc] init];
 36.      self.picker.sourceType = UIImagePickerControllerSourceTypePhotoLibrary;
 37.      self.picker.allowsEditing = YES;
 38.      self.picker.delegate = self;
 39.
 40.      NSLog(@"%d", [@"foo" retainCount]);
 41.  }
 42.
 43.  - (void)viewDidUnload
 44.  {
 45.      // release properties
 46.      self.imageView = nil;
 47.      self.picker = nil;
 48.
```

```objc
49.        [super viewDidUnload];
50.  }
51.
52.  - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
53.  {
54.       return (interfaceOrientation == UIInterfaceOrientationPortrait);
55.  }
56.
57.
58.  /**
59.   * Fired when button is pressed
60.   *
61.   */
62.  - (IBAction)pressed
63.  {
64.       // show image picker
65.       [self presentModalViewController:self.picker animated:YES];
66.  }
67.
68.  /**
69.   * Fired when user selects image from picker
70.   *
71.   */
72.  - (void)imagePickerController:(UIImagePickerController *)picker didFinishPickingMediaWithInfo:(NSDictionary *)info
73.  {
74.       // display selected image in UIImageView and get rid of picker
75.       self.imageView.image = [info objectForKey:UIImagePickerControllerEditedImage];
76.       [self dismissModalViewControllerAnimated:YES];
77.  }
78.
79.  @end
```

```
1.  /**
2.   *  main.m
3.   *  Section4App5
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. int main(int argc, char *argv[])
11. {
12.     NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.     int retVal = UIApplicationMain(argc, argv, nil, nil);
14.     [pool release];
15.     return retVal;
16. }
```

```objc
1.  /**
2.   *  Section4App6AppDelegate.m
3.   *  Section4App6
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App6AppDelegate.h"
9.  #import "Section4App6ViewController.h"
10.
11. @implementation Section4App6AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
```

```
45.        */
46. }
47.
48. - (void)applicationDidBecomeActive:(UIApplication *)application
49. {
50.     /*
51.      Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
    background, optionally refresh the user interface.
52.      */
53. }
54.
55. - (void)applicationWillTerminate:(UIApplication *)application
56. {
57.     /*
58.      Called when the application is about to terminate.
59.      Save data if appropriate.
60.      See also applicationDidEnterBackground:.
61.      */
62. }
63.
64. - (void)dealloc
65. {
66.     [_window release];
67.     [_viewController release];
68.     [super dealloc];
69. }
70.
71. @end
```

```objc
1.  /**
2.   *  Section4App6ViewController.m
3.   *  Section4App6
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App6ViewController.h"
9.
10. @implementation Section4App6ViewController
11.
12. @synthesize button1=_button1, button2=_button2, button1Presses=_button1Presses, button2Presses=_button2Presses;
13.
14. - (void)dealloc
15. {
16.     [super dealloc];
17. }
18.
19. - (void)didReceiveMemoryWarning
20. {
21.     [super didReceiveMemoryWarning];
22. }
23.
24. #pragma mark - View lifecycle
25.
26. - (void)viewDidLoad
27. {
28.     [super viewDidLoad];
29.     self.button1Presses = 0;
30.     self.button2Presses = 0;
31. }
32.
33. - (void)viewDidUnload
34. {
35.     [super viewDidUnload];
36. }
37.
38. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
39. {
40.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
41. }
42.
43. /**
44.  * Fired when either button is pressed, animate button appropriately
45.  *
46.  */
47. - (IBAction)buttonPressed:(id)sender
48. {
```

```objc
49.        // start animation block
50.        [UIView beginAnimations:@"button" context:nil];
51.
52.        // determine which button was pressed based on tag
53.        if ([sender tag] == 0) {
54.            // keep track of how many times button was pressed (so we animate in right direction)
55.            self.button1Presses++;
56.
57.            // move center of button either upwards or downwards
58.            if (self.button1Presses % 2)
59.                self.button1.center = CGPointMake(self.button1.center.x, self.button1.center.y + 300.0f);
60.            else
61.                self.button1.center = CGPointMake(self.button1.center.x, self.button1.center.y - 300.0f);
62.        }
63.
64.        else if ([sender tag] == 1) {
65.            // keep track of button presses again
66.            self.button2Presses++;
67.
68.            // set custom animation properties
69.            [UIView setAnimationTransition:UIViewAnimationTransitionCurlUp forView:self.button2 cache:YES];
70.            [UIView setAnimationDuration:1.0f];
71.            [UIView setAnimationDelegate:self];
72.            [UIView setAnimationDidStopSelector:@selector(animationDone:finished:context:)];
73.
74.            // change opacity of button
75.            if (self.button2Presses % 2)
76.                self.button2.alpha = 0.1f;
77.            else
78.                self.button2.alpha = 1.0f;
79.        }
80.
81.        // commit animation to start
82.        [UIView commitAnimations];
83.    }
84.
85.    /**
86.     * Fired when animation completes, attached via setAnimationDelegate and setAnimationDidStopSelector
87.     *
88.     */
89.    - (void)animationDone:(NSString *)animation finished:(BOOL)finished context:(void *)context
90.    {
91.        UIAlertView *alert = [[UIAlertView alloc] initWithTitle:@"Animation" message:@"Done!" delegate:nil
92.                                         cancelButtonTitle:@"Sweet!" otherButtonTitles:nil];
93.        [alert show];
94.        [alert release];
95.    }
96.
```

97. @end

```
1.  /**
2.   *  main.m
3.   *  Section4App6
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. int main(int argc, char *argv[])
11. {
12.     NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.     int retVal = UIApplicationMain(argc, argv, nil, nil);
14.     [pool release];
15.     return retVal;
16. }
```

```objc
1.  /**
2.   *  Section4App7AppDelegate.m
3.   *  Section4App7
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App7AppDelegate.h"
9.  #import "Section4App7ViewController.h"
10.
11. @implementation Section4App7AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
     (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
     the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
     your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
     background.
```

```
45.          */
46.    }
47.
48.    - (void)applicationDidBecomeActive:(UIApplication *)application
49.    {
50.          /*
51.           Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
       background, optionally refresh the user interface.
52.          */
53.    }
54.
55.    - (void)applicationWillTerminate:(UIApplication *)application
56.    {
57.          /*
58.           Called when the application is about to terminate.
59.           Save data if appropriate.
60.           See also applicationDidEnterBackground:.
61.          */
62.    }
63.
64.    - (void)dealloc
65.    {
66.        [_window release];
67.        [_viewController release];
68.        [super dealloc];
69.    }
70.
71.    @end
```

```
1.  /**
2.   *  Section4App7ViewController.m
3.   *  Section4App7
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App7ViewController.h"
9.  #import "QuartzCore/CAAnimation.h"
10.
11. @implementation Section4App7ViewController
12.
13. @synthesize button1=_button1, button2=_button2;
14.
15. - (void)dealloc
16. {
17.     // release ivars
18.     [_button1 release];
19.     [_button2 release];
20.
21.     [super dealloc];
22. }
23.
24. - (void)didReceiveMemoryWarning
25. {
26.     [super didReceiveMemoryWarning];
27. }
28.
29. #pragma mark - View lifecycle
30.
31. - (void)viewDidLoad
32. {
33.     [super viewDidLoad];
34. }
35.
36. - (void)viewDidUnload
37. {
38.     // release properties
39.     self.button1 = nil;
40.     self.button2 = nil;
41.
42.     [super viewDidUnload];
43. }
44.
45. - (IBAction)buttonPressed:(id)sender
46. {
47.     // top button
48.     if ([sender tag] == 0) {
```

```
49.          // create path to animate along
50.          CGMutablePathRef path = CGPathCreateMutable();
51.
52.          // start path at button center
53.          CGPathMoveToPoint(path, NULL, self.button1.center.x, self.button1.center.y);
54.          // move button to top left corner
55.          CGPathAddLineToPoint(path, NULL, 50.0f, 50.0f);
56.          CGPathAddLineToPoint(path, NULL, 50.0f, 200.0f);
57.          CGPathAddLineToPoint(path, NULL, 200.0f, 100.0f);
58.
59.          // create animation from path we just created
60.          CAKeyframeAnimation *translateAnimation = [CAKeyframeAnimation animationWithKeyPath:@"position"];
61.          translateAnimation.path = path;
62.          translateAnimation.duration = 3.0f;
63.
64.          // animate button along path
65.          [self.button1.layer addAnimation:translateAnimation forKey:@"position"];
66.      }
67.
68.      // bottom button
69.      else if ([sender tag] == 1) {
70.          // create three different transformation matrices
71.          NSValue *first = [NSValue valueWithCATransform3D:CATransform3DMakeRotation(0.0, 1.0f, 1.0f, 0.0f)];
72.          NSValue *second = [NSValue valueWithCATransform3D:CATransform3DMakeRotation(M_PI, 1.0f, 1.0f, 0.0f)];
73.          NSValue *third = [NSValue valueWithCATransform3D:CATransform3DMakeScale(2.0, 2.0, 2.0)];
74.
75.          // create animation from transformation values
76.          CAKeyframeAnimation *rotateAnimation = [CAKeyframeAnimation animationWithKeyPath:@"transform"];
77.          rotateAnimation.values = [NSArray arrayWithObjects:first, second, third, nil];
78.          rotateAnimation.duration = 2.0f;
79.          rotateAnimation.autoreverses = YES;
80.
81.          // animate button
82.          [self.button2.layer addAnimation:rotateAnimation forKey:@"transform"];
83.      }
84.  }
85.
86.  - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
87.  {
88.      return (interfaceOrientation == UIInterfaceOrientationPortrait);
89.  }
90.
91.  @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App7
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```objc
1.  /**
2.   * PhotoView.m
3.   * Section4App8
4.   * Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "PhotoView.h"
9.
10. @implementation PhotoView
11.
12. - (id)initWithFrame:(CGRect)frame
13. {
14.     self = [super initWithFrame:frame];
15.     if (self) {
16.         // Initialization code
17.     }
18.     return self;
19. }
20.
21. - (void)drawRect:(CGRect)rect
22. {
23.     // draw  image
24.     UIImage *david1 = [UIImage imageNamed:@"david-1.jpg"];
25.     UIImage *david2 = [UIImage imageNamed:@"david-2.jpg"];
26.     [david1 drawInRect:rect];
27.
28.     // draw small square on top of image
29.     CGContextRef context = UIGraphicsGetCurrentContext();
30.     CGRect square = CGRectMake(150.0f, 150.0f, 100.0f, 100.0f);
31.     CGContextSetFillColorWithColor(context, [UIColor greenColor].CGColor);
32.     CGContextFillRect(context, square);
33.
34.     // create triangle to frame second photo
35.     CGMutablePathRef path2 = CGPathCreateMutable();
36.     CGPathMoveToPoint(path2, NULL, 100.0f, 250.0f);
37.     CGPathAddLineToPoint(path2, NULL, 50.0f, 370.0f);
38.     CGPathAddLineToPoint(path2, NULL, 190.0f, 340.0f);
39.     CGPathCloseSubpath(path2);
40.
41.     // add path to context and clip everything to be drawn around that path
42.     CGContextAddPath(context, path2);
43.     CGContextClip(context);
44.
45.     // draw image
46.     CGContextDrawImage(context, CGRectMake(40.0f, 280.0f, 100.0f, 150.0f), david2.CGImage);
47. }
48.
```

```
49.  - (void)dealloc
50.  {
51.      [super dealloc];
52.  }
53.
54.  @end
```

```objectivec
1.  /**
2.   *  Section4App8AppDelegate.m
3.   *  Section4App8
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App8AppDelegate.h"
9.  #import "Section4App8ViewController.h"
10.
11. @implementation Section4App8AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     // Override point for customization after application launch.
19.
20.     self.window.rootViewController = self.viewController;
21.     [self.window makeKeyAndVisible];
22.     return YES;
23. }
24.
25. - (void)applicationWillResignActive:(UIApplication *)application
26. {
27.     /*
28.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
29.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
30.      */
31. }
32.
33. - (void)applicationDidEnterBackground:(UIApplication *)application
34. {
35.     /*
36.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
37.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
38.      */
39. }
40.
41. - (void)applicationWillEnterForeground:(UIApplication *)application
42. {
43.     /*
44.      Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
    background.
```

```
45.        */
46.  }
47.
48.  - (void)applicationDidBecomeActive:(UIApplication *)application
49.  {
50.        /*
51.         Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
52.        */
53.  }
54.
55.  - (void)applicationWillTerminate:(UIApplication *)application
56.  {
57.        /*
58.         Called when the application is about to terminate.
59.         Save data if appropriate.
60.         See also applicationDidEnterBackground:.
61.        */
62.  }
63.
64.  - (void)dealloc
65.  {
66.        [_window release];
67.        [_viewController release];
68.        [super dealloc];
69.  }
70.
71.  @end
```

```
1.  /**
2.   *  Section4App8ViewController.m
3.   *  Section4App8
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App8ViewController.h"
9.
10. @implementation Section4App8ViewController
11.
12. - (void)dealloc
13. {
14.     [super dealloc];
15. }
16.
17. - (void)didReceiveMemoryWarning
18. {
19.     [super didReceiveMemoryWarning];
20. }
21.
22. #pragma mark - View lifecycle
23.
24. - (void)viewDidLoad
25. {
26.     [super viewDidLoad];
27. }
28.
29. - (void)viewDidUnload
30. {
31.     [super viewDidUnload];
32. }
33.
34. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
35. {
36.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
37. }
38.
39. @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App8
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```objc
1.  /**
2.   *  Section4App9AppDelegate.m
3.   *  Section4App9
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App9AppDelegate.h"
9.  #import "Section4App9ViewController.h"
10.
11. @implementation Section4App9AppDelegate
12.
13. @synthesize window=_window;
14. @synthesize viewController=_viewController;
15.
16. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
17. {
18.     self.window.rootViewController = self.viewController;
19.     [self.window makeKeyAndVisible];
20.     return YES;
21. }
22.
23. - (BOOL)application:(UIApplication *)application handleOpenURL:(NSURL *)url
24. {
25.     // get text from URL, ignoring the cs76:// part and decoding html-encoded characters
26.     self.viewController.label.text = [[[url resourceSpecifier] substringFromIndex:2]
27.                                     stringByReplacingPercentEscapesUsingEncoding:NSUTF8StringEncoding];
28.     return YES;
29. }
30.
31. - (void)applicationWillResignActive:(UIApplication *)application
32. {
33.     /*
34.      Sent when the application is about to move from active to inactive state. This can occur for certain types of temporary interruptions
    (such as an incoming phone call or SMS message) or when the user quits the application and it begins the transition to the background state.
35.      Use this method to pause ongoing tasks, disable timers, and throttle down OpenGL ES frame rates. Games should use this method to pause
    the game.
36.      */
37. }
38.
39. - (void)applicationDidEnterBackground:(UIApplication *)application
40. {
41.     /*
42.      Use this method to release shared resources, save user data, invalidate timers, and store enough application state information to restore
    your application to its current state in case it is terminated later.
43.      If your application supports background execution, this method is called instead of applicationWillTerminate: when the user quits.
44.      */
45. }
```

```
46.
47.  - (void)applicationWillEnterForeground:(UIApplication *)application
48.  {
49.      /*
50.       Called as part of the transition from the background to the inactive state; here you can undo many of the changes made on entering the
     background.
51.       */
52.  }
53.
54.  - (void)applicationDidBecomeActive:(UIApplication *)application
55.  {
56.      /*
57.       Restart any tasks that were paused (or not yet started) while the application was inactive. If the application was previously in the
     background, optionally refresh the user interface.
58.       */
59.  }
60.
61.  - (void)applicationWillTerminate:(UIApplication *)application
62.  {
63.      /*
64.       Called when the application is about to terminate.
65.       Save data if appropriate.
66.       See also applicationDidEnterBackground:.
67.       */
68.  }
69.
70.  - (void)dealloc
71.  {
72.      [_window release];
73.      [_viewController release];
74.      [super dealloc];
75.  }
76.
77.  @end
```

```objc
1.  /**
2.   *  Section4App9ViewController.m
3.   *  Section4App9
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import "Section4App9ViewController.h"
9.
10. @implementation Section4App9ViewController
11.
12. @synthesize label=_label;
13.
14. - (void)dealloc
15. {
16.     // release ivars
17.     [_label release];
18.
19.     [super dealloc];
20. }
21.
22. - (void)didReceiveMemoryWarning
23. {
24.     [super didReceiveMemoryWarning];
25. }
26.
27. #pragma mark - View lifecycle
28.
29. - (void)viewDidLoad
30. {
31.     [super viewDidLoad];
32. }
33.
34. - (void)viewDidUnload
35. {
36.     // release properties
37.     self.label = nil;
38.
39.     [super viewDidUnload];
40. }
41.
42. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
43. {
44.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
45. }
46.
47. /**
48.  * Fired when user presses button, open Safari with given URL
```

```
49.   *
50.   */
51.  - (IBAction)openSafari
52.  {
53.      [[UIApplication sharedApplication] openURL:[NSURL URLWithString:@"http://google.com"]];
54.  }
55.
56.  @end
```

```
1.   /**
2.    *  main.m
3.    *  Section4App9
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  int main(int argc, char *argv[])
11.  {
12.      NSAutoreleasePool *pool = [[NSAutoreleasePool alloc] init];
13.      int retVal = UIApplicationMain(argc, argv, nil, nil);
14.      [pool release];
15.      return retVal;
16.  }
```

```
 1.  /**
 2.   *  PathsView.h
 3.   *  Section4App0
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @interface PathsView: UIView {
11.
12.  }
13.
14.  @end
```

```objc
1.  /**
2.   *  Section4App0AppDelegate.h
3.   *  Section4App0
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @class Section4App0ViewController;
11.
12. @interface Section4App0AppDelegate : NSObject <UIApplicationDelegate> {
13.
14. }
15.
16. @property (nonatomic, retain) IBOutlet UIWindow *window;
17. @property (nonatomic, retain) IBOutlet Section4App0ViewController *viewController;
18.
19. @end
```

```
1.  /**
2.   *  Section4App0ViewController.h
3.   *  Section4App0
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App0ViewController : UIViewController {
11.
12. }
13.
14. @end
```

```objc
1.  /**
2.   *  Section4App1AppDelegate.h
3.   *  Section4App1
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @class Section4App1ViewController;
11.
12. @interface Section4App1AppDelegate : NSObject <UIApplicationDelegate> {
13.
14. }
15.
16. @property (nonatomic, retain) IBOutlet UIWindow *window;
17. @property (nonatomic, retain) IBOutlet Section4App1ViewController *viewController;
18.
19. @end
```

```
1.   /**
2.    *  Section4App1ViewController.h
3.    *  Section4App1
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  @interface Section4App1ViewController : UIViewController {
11.
12.  }
13.
14.  @end
```

```
1.  /**
2.   *  ShadowView.h
3.   *  Section4App1
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface ShadowView : UIView {
11.
12. }
13.
14. @end
```

```
1.  /**
2.   * GradientView.h
3.   * Section4App2
4.   * Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface GradientView : UIView {
11.
12. }
13.
14. @end
```

```objc
1.  /**
2.   *  Section4App2AppDelegate.h
3.   *  Section4App2
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @class Section4App2ViewController;
11.
12. @interface Section4App2AppDelegate : NSObject <UIApplicationDelegate> {
13.
14. }
15.
16. @property (nonatomic, retain) IBOutlet UIWindow *window;
17. @property (nonatomic, retain) IBOutlet Section4App2ViewController *viewController;
18.
19. @end
```

```
1.  /**
2.   *  Section4App2ViewController.h
3.   *  Section4App2
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App2ViewController : UIViewController {
11.
12. }
13.
14. @end
```

```
 1.  /**
 2.   *  CustomCell.h
 3.   *  Section4App3
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @interface CustomCell : UIView {
11.
12.  }
13.
14.  @end
```

```objc
1.  /**
2.   *  RootViewController.h
3.   *  Section4App3
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface RootViewController : UITableViewController {
11.     NSMutableArray *_fruits;
12. }
13.
14. @property (nonatomic, retain) NSMutableArray *fruits;
15.
16. @end
```

```
1.   /**
2.    *  Section4App3AppDelegate.h
3.    *  Section4App3
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  @interface Section4App3AppDelegate : NSObject <UIApplicationDelegate> {
11.
12.  }
13.
14.  @property (nonatomic, retain) IBOutlet UIWindow *window;
15.  @property (nonatomic, retain) IBOutlet UINavigationController *navigationController;
16.
17.  @end
```

```objc
1.  /**
2.   *  CustomButton.h
3.   *  Section4App4
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface CustomButton : UIButton {
11.
12. }
13.
14. - (id)initWithFrame:(CGRect)frame title:(NSString *)title color:(UIColor *)color;
15.
16. @end
```

```
 1.  /**
 2.   *  Section4App4AppDelegate.h
 3.   *  Section4App4
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @class Section4App4ViewController;
11.
12.  @interface Section4App4AppDelegate : NSObject <UIApplicationDelegate> {
13.
14.  }
15.
16.  @property (nonatomic, retain) IBOutlet UIWindow *window;
17.  @property (nonatomic, retain) IBOutlet Section4App4ViewController *viewController;
18.
19.  @end
```

```
1.  /**
2.   *  Section4App4ViewController.h
3.   *  Section4App4
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App4ViewController : UIViewController {
11.
12. }
13.
14. @end
```

```
1.  /**
2.   *  Section4App5AppDelegate.h
3.   *  Section4App5
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @class Section4App5ViewController;
11.
12. @interface Section4App5AppDelegate : NSObject <UIApplicationDelegate> {
13.
14. }
15.
16. @property (nonatomic, retain) IBOutlet UIWindow *window;
17. @property (nonatomic, retain) IBOutlet Section4App5ViewController *viewController;
18.
19. @end
```

```
1.  /**
2.   *  Section4App5ViewController.h
3.   *  Section4App5
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App5ViewController : UIViewController
11.     <UIImagePickerControllerDelegate, UINavigationControllerDelegate>
12. {
13.     UIImageView *_imageView;
14.     UIImagePickerController *_picker;
15. }
16.
17. @property (nonatomic, retain) IBOutlet UIImageView *imageView;
18. @property (nonatomic, retain) UIImagePickerController *picker;
19.
20. - (IBAction)pressed;
21.
22. @end
```

```
1.  /**
2.   *  Section4App6AppDelegate.h
3.   *  Section4App6
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @class Section4App6ViewController;
11.
12. @interface Section4App6AppDelegate : NSObject <UIApplicationDelegate> {
13.
14. }
15.
16. @property (nonatomic, retain) IBOutlet UIWindow *window;
17. @property (nonatomic, retain) IBOutlet Section4App6ViewController *viewController;
18.
19. @end
```

```
1.  /**
2.   *  Section4App6ViewController.h
3.   *  Section4App6
4.   *  Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App6ViewController : UIViewController {
11.     UIButton *_button1, *_button2;
12.     int _button1Presses, _button2Presses;
13. }
14.
15. @property (nonatomic, retain) IBOutlet UIButton *button1;
16. @property (nonatomic, retain) IBOutlet UIButton *button2;
17. @property (nonatomic, assign) int button1Presses;
18. @property (nonatomic, assign) int button2Presses;
19.
20. - (IBAction)buttonPressed:(id)sender;
21. - (void)animationDone:(NSString *)animation finished:(BOOL)finished context:(void *)context;
22.
23. @end
```

```
 1.  /**
 2.   *  Section4App7AppDelegate.h
 3.   *  Section4App7
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @class Section4App7ViewController;
11.
12.  @interface Section4App7AppDelegate : NSObject <UIApplicationDelegate> {
13.
14.  }
15.
16.  @property (nonatomic, retain) IBOutlet UIWindow *window;
17.  @property (nonatomic, retain) IBOutlet Section4App7ViewController *viewController;
18.
19.  @end
```

```objc
1.  /**
2.   * Section4App7ViewController.h
3.   * Section4App7
4.   * Tommy MacWilliam, 2011
5.   *
6.   */
7.
8.  #import <UIKit/UIKit.h>
9.
10. @interface Section4App7ViewController : UIViewController {
11.     UIButton *_button1, *_button2;
12. }
13.
14. @property (nonatomic, retain) IBOutlet UIButton *button1;
15. @property (nonatomic, retain) IBOutlet UIButton *button2;
16.
17. - (IBAction)buttonPressed:(id)sender;
18.
19. @end
```

```
1.   /**
2.    *  PhotoView.h
3.    *  Section4App8
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  @interface PhotoView : UIView {
11.
12.  }
13.
14.  @end
```

```
 1.  /**
 2.   *  Section4App8AppDelegate.h
 3.   *  Section4App8
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @class Section4App8ViewController;
11.
12.  @interface Section4App8AppDelegate : NSObject <UIApplicationDelegate> {
13.
14.  }
15.
16.  @property (nonatomic, retain) IBOutlet UIWindow *window;
17.  @property (nonatomic, retain) IBOutlet Section4App8ViewController *viewController;
18.
19.  @end
```

```
 1.  /**
 2.   *  Section4App8ViewController.h
 3.   *  Section4App8
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @interface Section4App8ViewController : UIViewController {
11.
12.  }
13.
14.  @end
```

```objc
1.   /**
2.    *  Section4App9AppDelegate.h
3.    *  Section4App9
4.    *  Tommy MacWilliam, 2011
5.    *
6.    */
7.
8.   #import <UIKit/UIKit.h>
9.
10.  @class Section4App9ViewController;
11.
12.  @interface Section4App9AppDelegate : NSObject <UIApplicationDelegate> {
13.
14.  }
15.
16.  @property (nonatomic, retain) IBOutlet UIWindow *window;
17.  @property (nonatomic, retain) IBOutlet Section4App9ViewController *viewController;
18.
19.  @end
```

```
 1.  /**
 2.   *  Section4App9ViewController.h
 3.   *  Section4App9
 4.   *  Tommy MacWilliam, 2011
 5.   *
 6.   */
 7.
 8.  #import <UIKit/UIKit.h>
 9.
10.  @interface Section4App9ViewController : UIViewController {
11.      UILabel *_label;
12.  }
13.
14.  @property (nonatomic, retain) IBOutlet UILabel *label;
15.
16.  - (IBAction)openSafari;
17.
18.  @end
```