

```
1. //
2. // Account.h
3. // ATM
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import <Foundation/Foundation.h>
13.
14. @interface Account : NSObject {
15. }
16.
17. @property (assign, nonatomic) unsigned long long balance;
18.
19. @end
```

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5. // David J. Malan
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9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import "Account.h"
13.
14. @implementation Account
15.
16. @synthesize balance=_balance;
17.
18. - (id)init
19. {
20.     if (self = [super init]) {
21.         self.balance = 0;
22.     }
23.     return self;
24. }
25.
26. @end
```

```
1. //
2. // AppDelegate.h
3. // ATM
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import <UIKit/UIKit.h>
13.
14. @class ViewController;
15.
16. @interface AppDelegate : UIResponder <UIApplicationDelegate>
17.
18. @property (strong, nonatomic) ViewController *viewController;
19. @property (strong, nonatomic) UIWindow *window;
20.
21. @end
```

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8. //
9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import "AppDelegate.h"
13.
14. #import "ViewController.h"
15.
16. @implementation AppDelegate
17.
18. @synthesize viewController = _viewController;
19. @synthesize window = _window;
20.
21. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
22. {
23.     self.window = [[UIWindow alloc] initWithFrame:[[UIScreen mainScreen] bounds]];
24.     self.viewController = [[ViewController alloc] initWithNibName:@"ViewController" bundle:nil];
25.     self.window.rootViewController = self.viewController;
26.     [self.window makeKeyAndVisible];
27.     return YES;
28. }
29.
30. @end
```

```
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9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import <UIKit/UIKit.h>
13. #import "Account.h"
14.
15. @interface ViewController : UIViewController {
16. }
17.
18. @property (nonatomic, strong) Account *account;
19. @property (assign, nonatomic) unsigned long long amount;
20. @property (nonatomic, weak) IBOutlet UILabel *balanceLabel;
21. @property (nonatomic, weak) IBOutlet UILabel *depositLabel;
22.
23. - (IBAction)clear:(id)sender;
24. - (IBAction)deposit:(id)sender;
25. - (IBAction)digit:(id)sender;
26. - (void)show;
27.
28. @end
```

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9. // Simulates an ATM (that only accepts deposits).
10. //
11.
12. #import "ViewController.h"
13.
14. @implementation ViewController
15.
16. @synthesize account=_account;
17. @synthesize amount=_amount;
18. @synthesize balanceLabel=_balanceLabel;
19. @synthesize depositLabel=_depositLabel;
20.
21. - (IBAction)clear:(id)sender
22. {
23.     // clear input
24.     self.amount = 0;
25.     [self show];
26. }
27.
28. - (IBAction)deposit:(id)sender
29. {
30.     // deposit amount
31.     self.account.balance += self.amount;
32.
33.     // clear input
34.     self.amount = 0;
35.     [self show];
36. }
37.
38. - (IBAction)digit:(id)sender
39. {
40.     // append digit to amount
41.     UIButton *b = (UIButton *)sender;
42.     self.amount = self.amount * 10 + b.tag;
43.     [self show];
44. }
45.
46. - (void)show
47. {
48.     // show balance
```

```
49.     self.balanceLabel.text = [NSString stringWithFormat:@"%$.11u", self.account.balance];
50.
51.     // show input
52.     self.depositLabel.text = [NSString stringWithFormat:@"%$.11u", self.amount];
53. }
54.
55. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
56. {
57.     return (interfaceOrientation == UIInterfaceOrientationPortrait);
58. }
59.
60. - (void)viewDidLoad
61. {
62.     // create account
63.     self.account = [[Account alloc] init];
64.     [self show];
65. }
66.
67. @end
```

```
1. //
2. // AppDelegate.h
3. // SingleView
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Demonstrates a Single View Application.
10. //
11.
12. #import <UIKit/UIKit.h>
13.
14. @class ViewController;
15.
16. @interface AppDelegate : UIResponder <UIApplicationDelegate>
17.
18. @property (strong, nonatomic) ViewController *viewController;
19. @property (strong, nonatomic) UIWindow *window;
20.
21. @end
```



```
1. //
2. // AppDelegate.m
3. // SingleView
4. //
5. // David J. Malan
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8. //
9. // Demonstrates a Single View Application.
10. //
11.
12. #import "AppDelegate.h"
13. #import "ViewController.h"
14.
15. @implementation AppDelegate
16.
17. @synthesize viewController = _viewController;
18. @synthesize window = _window;
19.
20. - (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions
21. {
22.     self.window = [[UIWindow alloc] initWithFrame:[[UIScreen mainScreen] bounds]];
23.     self.viewController = [[ViewController alloc] initWithNibName:@"ViewController" bundle:nil];
24.     self.window.rootViewController = self.viewController;
25.     [self.window makeKeyAndVisible];
26.     return YES;
27. }
28.
29. @end
```

```
1. //
2. // ViewController.h
3. // SingleView
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Demonstrates a Single View Application.
10. //
11.
12. #import <UIKit/UIKit.h>
13.
14. @interface ViewController : UIViewController
15. @end
```

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1. //
2. // ViewController.m
3. // SingleView
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Demonstrates a Single View Application.
10. //
11.
12. #import "ViewController.h"
13.
14. @implementation ViewController
15.
16. - (BOOL)shouldAutorotateToInterfaceOrientation:(UIInterfaceOrientation)interfaceOrientation
17. {
18.     return (interfaceOrientation != UIInterfaceOrientationPortraitUpsideDown);
19. }
20.
21. @end
```

```
1. //
2. // Student.h
3. // Students7
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Declares a student with init methods.
10. //
11.
12. #import <Foundation/Foundation.h>
13.
14. @interface Student : NSObject {
15. }
16.
17. @property (assign, nonatomic, readwrite) int age;
18. @property (copy, nonatomic, readwrite) NSString *name;
19.
20. - (id)initWithName:(NSString *)name andAge:(int)age;
21.
22. @end
```

```
1. //
2. // Student.m
3. // Students7
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Defines a student with init methods.
10. //
11.
12. #import "Student.h"
13.
14. @implementation Student
15.
16. @synthesize age=_age;
17. @synthesize name=_name;
18.
19. - (id)init
20. {
21.     self = [self initWithName:@"John" andAge:404];
22.     return self;
23. }
24.
25. - (id)initWithName:(NSString *)name andAge:(int)age
26. {
27.     if (self = [super init])
28.     {
29.         self.age = age;
30.         self.name = name;
31.     }
32.     return self;
33. }
34.
35. @end
```

```
1. //
2. // Student.h
3. // Students9
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Declares a student with convenience method.
10. //
11.
12. #import <Foundation/Foundation.h>
13.
14. @interface Student : NSObject {
15. }
16.
17. @property (assign, nonatomic, readwrite) int age;
18. @property (copy, nonatomic, readwrite) NSString *name;
19.
20. + (id)studentWithName:(NSString *)name andAge:(int)age;
21. - (id)initWithName:(NSString *)name andAge:(int)age;
22.
23. @end
```

```
1. //
2. // Student.m
3. // Students9
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Defines a student with convenience method.
10. //
11.
12. #import "Student.h"
13.
14. @implementation Student
15.
16. @synthesize age=_age;
17. @synthesize name=_name;
18.
19. + (id)studentWithName:(NSString *)name andAge:(int)age
20. {
21.     return [[Student alloc] initWithName:name andAge:age];
22. }
23.
24. - (id)init
25. {
26.     self = [self initWithName:@"John" andAge:403];
27.     return self;
28. }
29.
30. - (id)initWithName:(NSString *)name andAge:(int)age
31. {
32.     if (self = [super init])
33.     {
34.         self.age = age;
35.         self.name = name;
36.     }
37.     return self;
38. }
39.
40. @end
```

```
1. //
2. // Student.h
3. // Students10
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Declares a student with (non-init) instance method.
10. //
11.
12. #import <Foundation/Foundation.h>
13.
14. @interface Student : NSObject {
15. }
16.
17. @property (assign, nonatomic, readwrite) int age;
18. @property (copy, nonatomic, readwrite) NSString *name;
19.
20. - (id)initWithName:(NSString *)name andAge:(int)age;
21. - (void)greet;
22.
23. @end
```



```
1. //
2. // Student.m
3. // Students9
4. //
5. // David J. Malan
6. // Harvard University
7. // malan@harvard.edu
8. //
9. // Defines a student with (non-init) instance method.
10. //
11.
12. #import "Student.h"
13.
14. @implementation Student
15.
16. @synthesize age=_age;
17. @synthesize name=_name;
18.
19. - (id)init
20. {
21.     self = [self initWithName:@"John" andAge:403];
22.     return self;
23. }
24.
25. - (id)initWithName:(NSString *)name andAge:(int)age
26. {
27.     if ((self = [super init]))
28.     {
29.         self.age = age;
30.         self.name = name;
31.     }
32.     return self;
33. }
34.
35. - (void)greet
36. {
37.     NSLog(@"Hello, I am %@. I am %d years old.\n", _name, _age);
38. }
39.
40. @end
```