**44-542 Object Oriented Programming**

**Lab10: Sorting and Equals Lab Activity**

**Objective:** Covers the creation and usage of **Sorting, Equals, HashCode.**

**NOTE:**

* Do not hard code any values.
* Check the sample output to know how the results need to be printed.
* Read every instruction carefully and follow them strictly.
* Do not change the name of the attributes and methods given.
* @author notation should contain your full name.
* Use the Javadoc given to you to know the instance variables, classes, interfaces, abstract classes.
* Follow the Javadoc carefully to know the dependencies and method descriptions.
* Ensure your code is indented properly.

**How to View Javadoc**:

* Go to “Javadoc” 🡪 “index.html” to access the javadocs.

**Steps for Project Creation:**

1. Rename Lab09ExceptionsAndCasting project to Lastname\_Lab10SortingAndEquals where Lastname is your last name.
2. Define the packages and classes given in the Javadoc provided to you.
3. Create a driver class based on the comments provided to you in LibraryDriver.java file.
4. Check the sample output to know the proper appearance of your output.
5. Use shift+alt+f to indent your code.
6. Complete all the components given in the lab09 and start doing this lab.
7. Go through the Javadoc you will find some new classes named

* AnonymousDeviceList
* BookList
* FacultyList

Go through the Member class as well.

You can find the purpose of the classes and implementation in Javadoc

1. You will implement Comparable and Comparator interfaces in this lab. Go through the Javadoc to know the classes that implement these interfaces.
2. Write another test class and name it as EqualsAndHashCodeTest.
3. Write four test cases, two for testing equals () and two for testing hashCode() in FacultyList class.
4. Look at the assignment folder given to you to know how to write the test class.
5. You must use @Test annotation in order to run your test case.
6. All the instance variables should be private.

**Purpose of Anonymous Class:**

It should be used if you have to override method of class or interface. So that you can implement the method body there at the time of instantiation no need to use subclass instead to implement them.

**Sample Output:**

|  |
| --- |
| --------------------------------------  Printing Student details  --------------------------------------  MemberID: 919649853  Name: Mike Husser  Age: 4  Title: THE GIVER, Available: false, BookID: NWM\_B\_2, RackNo: FE.1.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: android charger, Available: false, DeviceID: NWM\_D\_3, RackNo: droid Charger\_D\_7  Courses Taken: IOS,HCI,DV  MemberID: 919646361  Name: Vamsi Ravva  Age: 15  Title: THE HUNGER GAMES, Available: false, BookID: NWM\_B\_9, RackNo: CT.4.2011, Edition: 2.0, Authors: Arml, D. L., Tan, P., Teck, T.  Title: THE GIVER, Available: false, BookID: NWM\_B\_10, RackNo: IQ.5.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: android charger, Available: false, DeviceID: NWM\_D\_11, RackNo: droid Charger\_D\_8  Courses Taken: Android,PM,ITM  MemberID: 919644615  Name: Jacob  Age: 16  Title: BEAUTIFUL DISASTER, Available: false, BookID: NWM\_B\_13, RackNo: XI.6.2010, Edition: 4.0, Authors: McGuire, J., James, E. M., Bain, D., Land, J.  Title: MURDER, SHE WROTE, Available: false, BookID: NWM\_B\_14, RackNo: PQ.7.2003, Edition: 3.0, Authors: Jess, M. R., Judith, C., Stephens, E. J.  Title: laptop, Available: false, DeviceID: NWM\_D\_15, RackNo: ptop\_D\_8  Courses Taken: Web,NS,DA  MemberID: 919642869  Name: Pavan Kalyan  Age: 12  Title: TWINKLE, Available: false, BookID: NWM\_B\_20, RackNo: WJ.9.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: iphone charger, Available: false, DeviceID: NWM\_D\_21, RackNo: Iphone Charger\_D\_8  Courses Taken: Physics,Chemistry,Maths  MemberID: 919641123  Name: Junior NTR  Age: 10  Title: THE RALF, Available: false, BookID: NWM\_B\_23, RackNo: HR.10.2011, Edition: 1.0, Authors: Webber, T., Rowling, J. K.  Title: CAN'T LIVE, Available: false, BookID: NWM\_B\_24, RackNo: ZR.11.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_25, RackNo: droid Charger\_D\_8  Courses Taken: Biology,Maths,Science  --------------------------------------  Printing Faculty details  --------------------------------------  MemberID: 919648107  Name: Sansa Stark  Age: 34  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_5, RackNo: IL.2.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_6, RackNo: HA.3.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_7, RackNo: droid Charger\_D\_7  Title: harrypoter3, Available: false, DVD ID: NWM\_DVD\_8, Rating: PG, Storage Capacity: 2.4  Department: MSACS  MemberID: 919639377  Name: Rob Stark  Age: 30  Title: THE ONE, Available: false, BookID: NWM\_B\_27, RackNo: PW.12.2016, Edition: 4.0, Authors: Roth, V., Bain, D., Jess, R. R.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_28, RackNo: ZD.13.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_29, RackNo: droid Charger\_D\_8  Title: harrypoter3, Available: false, DVD ID: NWM\_DVD\_30, Rating: PG, Storage Capacity: 2.4  Department: MSACS  MemberID: 919637631  Name: Frank Herbert  Age: 25  Title: OH MY GHOST, Available: false, BookID: NWM\_B\_31, RackNo: YB.14.2011, Edition: 3.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: BEAUTIFUL WEATHER, Available: false, BookID: NWM\_B\_32, RackNo: LZ.15.2010, Edition: 1.0, Authors: Hoover, C., Webber, T., Land, D. B.  Title: projector, Available: false, DeviceID: NWM\_D\_33, RackNo: ojector\_D\_8  Title: data cable, Available: false, DeviceID: NWM\_D\_34, RackNo: ta cable\_D\_8  Department: MSACS  MemberID: 919635885  Name: Hari Kiran  Age: 26  Title: EASY, Available: false, BookID: NWM\_B\_37, RackNo: XV.16.2005, Edition: 3.0, Authors: Green, J., Kim, R., Herbert, G. M.  Title: tablet, Available: false, DeviceID: NWM\_D\_38, RackNo: blet\_D\_8  Title: divergent, Available: false, DVD ID: NWM\_DVD\_39, Rating: PG\_13, Storage Capacity: 2.6  Department: MSIS  MemberID: 919634139  Name: Charles Kero  Age: 24  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_40, RackNo: NQ.17.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_41, RackNo: QZ.18.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: data cable, Available: false, DeviceID: NWM\_D\_42, RackNo: ta Cable\_D\_8  Title: the fault in our stars, Available: false, DVD ID: NWM\_DVD\_43, Rating: R, Storage Capacity: 2.7  Department: MSACS  ----------Checking Comparable Interface Implementation---------  -------------------------------------------------------------  Printing Student details sorting in natural order by their ID  -------------------------------------------------------------  MemberID: 919641123  Name: Junior NTR  Age: 10  Title: THE RALF, Available: false, BookID: NWM\_B\_23, RackNo: HR.10.2011, Edition: 1.0, Authors: Webber, T., Rowling, J. K.  Title: CAN'T LIVE, Available: false, BookID: NWM\_B\_24, RackNo: ZR.11.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_25, RackNo: droid Charger\_D\_8  Courses Taken: Biology,Maths,Science  MemberID: 919642869  Name: Pavan Kalyan  Age: 12  Title: TWINKLE, Available: false, BookID: NWM\_B\_20, RackNo: WJ.9.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: iphone charger, Available: false, DeviceID: NWM\_D\_21, RackNo: Iphone Charger\_D\_8  Courses Taken: Physics,Chemistry,Maths  MemberID: 919644615  Name: Jacob  Age: 16  Title: BEAUTIFUL DISASTER, Available: false, BookID: NWM\_B\_13, RackNo: XI.6.2010, Edition: 4.0, Authors: McGuire, J., James, E. M., Bain, D., Land, J.  Title: MURDER, SHE WROTE, Available: false, BookID: NWM\_B\_14, RackNo: PQ.7.2003, Edition: 3.0, Authors: Jess, M. R., Judith, C., Stephens, E. J.  Title: laptop, Available: false, DeviceID: NWM\_D\_15, RackNo: ptop\_D\_8  Courses Taken: Web,NS,DA  MemberID: 919646361  Name: Vamsi Ravva  Age: 15  Title: THE HUNGER GAMES, Available: false, BookID: NWM\_B\_9, RackNo: CT.4.2011, Edition: 2.0, Authors: Arml, D. L., Tan, P., Teck, T.  Title: THE GIVER, Available: false, BookID: NWM\_B\_10, RackNo: IQ.5.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: android charger, Available: false, DeviceID: NWM\_D\_11, RackNo: droid Charger\_D\_8  Courses Taken: Android,PM,ITM  MemberID: 919649853  Name: Mike Husser  Age: 4  Title: THE GIVER, Available: false, BookID: NWM\_B\_2, RackNo: FE.1.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: android charger, Available: false, DeviceID: NWM\_D\_3, RackNo: droid Charger\_D\_7  Courses Taken: IOS,HCI,DV  ---------------------------------------------------------------  Printing Faculty details sorting in natural order by their name  ---------------------------------------------------------------  MemberID: 919634139  Name: Charles Kero  Age: 24  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_40, RackNo: NQ.17.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_41, RackNo: QZ.18.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: data cable, Available: false, DeviceID: NWM\_D\_42, RackNo: ta Cable\_D\_8  Title: the fault in our stars, Available: false, DVD ID: NWM\_DVD\_43, Rating: R, Storage Capacity: 2.7  Department: MSACS  MemberID: 919637631  Name: Frank Herbert  Age: 25  Title: OH MY GHOST, Available: false, BookID: NWM\_B\_31, RackNo: YB.14.2011, Edition: 3.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: BEAUTIFUL WEATHER, Available: false, BookID: NWM\_B\_32, RackNo: LZ.15.2010, Edition: 1.0, Authors: Hoover, C., Webber, T., Land, D. B.  Title: projector, Available: false, DeviceID: NWM\_D\_33, RackNo: ojector\_D\_8  Title: data cable, Available: false, DeviceID: NWM\_D\_34, RackNo: ta cable\_D\_8  Department: MSACS  MemberID: 919635885  Name: Hari Kiran  Age: 26  Title: EASY, Available: false, BookID: NWM\_B\_37, RackNo: XV.16.2005, Edition: 3.0, Authors: Green, J., Kim, R., Herbert, G. M.  Title: tablet, Available: false, DeviceID: NWM\_D\_38, RackNo: blet\_D\_8  Title: divergent, Available: false, DVD ID: NWM\_DVD\_39, Rating: PG\_13, Storage Capacity: 2.6  Department: MSIS  MemberID: 919639377  Name: Rob Stark  Age: 30  Title: THE ONE, Available: false, BookID: NWM\_B\_27, RackNo: PW.12.2016, Edition: 4.0, Authors: Roth, V., Bain, D., Jess, R. R.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_28, RackNo: ZD.13.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_29, RackNo: droid Charger\_D\_8  Title: harrypoter3, Available: false, DVD ID: NWM\_DVD\_30, Rating: PG, Storage Capacity: 2.4  Department: MSACS  MemberID: 919648107  Name: Sansa Stark  Age: 34  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_5, RackNo: IL.2.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_6, RackNo: HA.3.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: android charger, Available: false, DeviceID: NWM\_D\_7, RackNo: droid Charger\_D\_7  Title: harrypoter3, Available: false, DVD ID: NWM\_DVD\_8, Rating: PG, Storage Capacity: 2.4  Department: MSACS  --------Checking the Comparator Interface Implementation-------  ------------------------------------------------------------  Printing List of Books by descending order of their edition  ------------------------------------------------------------  Title: THE RALF, Available: false, BookID: NWM\_B\_23, RackNo: HR.10.2011, Edition: 1.0, Authors: Webber, T., Rowling, J. K.  Title: BEAUTIFUL WEATHER, Available: false, BookID: NWM\_B\_32, RackNo: LZ.15.2010, Edition: 1.0, Authors: Hoover, C., Webber, T., Land, D. B.  Title: The Hunger Games, Available: false, BookID: NWM\_B\_1, RackNo: CP.0.2011, Edition: 2.0, Authors: Arml, D. L., Tan, P., Teck, T.  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_5, RackNo: IL.2.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: THE HUNGER GAMES, Available: false, BookID: NWM\_B\_9, RackNo: CT.4.2011, Edition: 2.0, Authors: Arml, D. L., Tan, P., Teck, T.  Title: THE HOBBIT, Available: false, BookID: NWM\_B\_40, RackNo: NQ.17.2011, Edition: 2.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: MURDER, SHE WROTE, Available: false, BookID: NWM\_B\_14, RackNo: PQ.7.2003, Edition: 3.0, Authors: Jess, M. R., Judith, C., Stephens, E. J.  Title: OH MY GHOST, Available: false, BookID: NWM\_B\_31, RackNo: YB.14.2011, Edition: 3.0, Authors: Targaryan, J. S., Taylor, R., Ben, J.  Title: EASY, Available: false, BookID: NWM\_B\_37, RackNo: XV.16.2005, Edition: 3.0, Authors: Green, J., Kim, R., Herbert, G. M.  Title: THE GIVER, Available: false, BookID: NWM\_B\_2, RackNo: FE.1.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_6, RackNo: HA.3.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: THE GIVER, Available: false, BookID: NWM\_B\_10, RackNo: IQ.5.2010, Edition: 4.0, Authors: Sierra, K., Goss, J., tek, L.  Title: BEAUTIFUL DISASTER, Available: false, BookID: NWM\_B\_13, RackNo: XI.6.2010, Edition: 4.0, Authors: McGuire, J., James, E. M., Bain, D., Land, J.  Title: The Mom, Available: false, BookID: NWM\_B\_19, RackNo: WQ.8.2002, Edition: 4.0, Authors: Day, T. W., Morgan, J. R.  Title: TWINKLE, Available: false, BookID: NWM\_B\_20, RackNo: WJ.9.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: CAN'T LIVE, Available: false, BookID: NWM\_B\_24, RackNo: ZR.11.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: THE ONE, Available: false, BookID: NWM\_B\_27, RackNo: PW.12.2016, Edition: 4.0, Authors: Roth, V., Bain, D., Jess, R. R.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_28, RackNo: ZD.13.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  Title: LEAVES OF GRASS, Available: false, BookID: NWM\_B\_41, RackNo: QZ.18.2010, Edition: 4.0, Authors: Tolkie, J., Patrick, G., Brandon, N.  ----------------Anonymous Class Implementation-----------------  ------------------------------------------------------  Devices that are issued  ------------------------------------------------------  android charger  android charger  android charger  laptop  iphone charger  android charger  android charger  projector  data cable  tablet  data cable  -------Checking the overrided equals and hashCode methods------  Answer for: Your inference from test cases for equals()  Answer for: Your inference from test cases for hashcode()  Answer for: Is all your test cases for equals() passed the tests or not. If not why???  Answer for: Is all your test cases for hashcode() passed the tests or not. If not why??? |

**Submit you solution by following the steps below:**

* Save your files in NetBeans.
* Zip your entire Project. (It should be called **Lastname\_lab10SortingAndEquals**.zip where Last name is your last name.)
* Submit the Zip file to the **lab10SortingAndEquals** dropbox.
* Download the Zip file which you have submitted.

Look in the Zip file and verify the class files, javadocs in the Zip folder are updated. If not, resave your project in **NetBeans** and resubmit