Project 1

**public** **class** Main {

**public** **static** **void** main(String[] args) **throws** CloneNotSupportedException, IOException, ClassNotFoundException {

// **TODO** Auto-generated method stub

//Open file

File file = **new** File("EmployeeList.dat");

EmployeeFactory ef = **new** EmployeeFactory();

Scanner scanner = **new** Scanner(System.***in***);

**if** (file.length() == 0) {

System.***out***.println("File is empty, generated empty map");

ef.addEmployee(scanner);

}

**else** {

System.***out***.println("Fill with data from file");

ObjectInputStream ois = **new** ObjectInputStream(**new** FileInputStream("EmployeeList.dat"));

ef = (EmployeeFactory) ois.readObject();

ef.addEmployee(scanner);

}

//Create data

scanner.close();

// Part a)

/\*\*

\* I loop through my ArrayList and print out each of the employees

\*/

System.***out***.println("Part a): ");

**for** (**int** i = 0; i < ef.empFact.size(); i++)

System.***out***.println(ef.empFact.get(i).toString() + '\n');

//Save data

ObjectOutputStream oos1 = **new** ObjectOutputStream(**new** FileOutputStream("EmployeeList.dat"));

oos1.writeObject(ef);

oos1.close();

}

}

**public** **interface** Employee {

**public** **abstract** String getFirstName();

**public** **abstract** **void** setFirstName(String nFirstName);

**public** **abstract** String getLastName();

**public** **abstract** **void** setLastName(String nLastName);

**public** **abstract** String getIdNum();

**public** **abstract** **void** setIdNum(String nId);

**public** **abstract** **char** getSex();

**public** **abstract** **void** setSex(**char** nSex);

**public** **abstract** Calendar getCalendar();

**public** **abstract** **void** setCalendar(Calendar nCalendar);

/\*\*

/\*\*

\* This abstract method returns the employee's monthly earnings

\* **@return** The employee's earnings

\*/

**public** **abstract** **double** monthlyEarning();

/\*\*

\* This abstract method modifies employees

\*/

**public** **abstract** **void** modifyEmployee(Scanner scan);

}

**interface** EmployeeInfo {

**final** **double** ***FACULITY\_MONTHLY\_SALARY*** = 5000.00;

**final** **int** ***STAFF\_MONTHLY\_HOURS\_WORKED*** = 150;

}

**public** **class** Education **implements** Serializable{

**private** String degree;

**private** String major;

**private** **int** research;

/\*\*

\* The default education constructor

\*/

**public** Education() {

degree = "";

major = "";

research = 0;

}

/\*\*

\* The normal education constructor

\* **@param** nDegree The degree they currently hold

\* **@param** nMajor What they majored in

\* **@param** nResearch How many people are on their research team

\*/

**public** Education(String nDegree, String nMajor, **int** nResearch) {

degree = nDegree;

major = nMajor;

research = nResearch;

}

/\*\*

\* This returns what degree they have

\* **@return** Returns the degree

\*/

**public** String getDegree() {

**return** degree;

}

/\*\*

\* This sets the degree they have

\* **@param** nDegree The degree they have

\*/

**public** **void** setDegree(String nDegree) {

degree = nDegree;

}

/\*\*

\* This returns what major they have

\* **@return** Returns the major

\*/

**public** String getMajor() {

**return** major;

}

/\*\*

\* This sets the major they have

\* **@param** nMajor The major they have

\*/

**public** **void** setMajor(String nMajor) {

major = nMajor;

}

/\*\*

\* This returns the amount of researchers they have

\* **@return** Returns the amount of researchers

\*/

**public** **int** getResearch() {

**return** research;

}

/\*\*

\* This sets the amount of researchers they have

\* **@param** nResearch The amount of researchers they have

\*/

**public** **void** setResearch(**int** nResearch) {

research = nResearch;

}

}

**public** **class** Staff **implements** Employee, Serializable{

**protected** String lastName;

**protected** String firstName;

**protected** String idNum;

**protected** **char** sex;

**protected** Calendar calendar = **new** GregorianCalendar();

**protected** **double** hourlyRate;

**private** **static** DecimalFormat *df2* = **new** DecimalFormat("#.##");

/\*\*

\* The default staff constructor

\*/

**public** Staff() {

**super**();

hourlyRate = 0;

}

/\*\*

\* The regular staff constructor

\* **@param** nLastName The staff member's last name

\* **@param** nFirstName The staff member's first name

\* **@param** nIDNum The staff member's ID number

\* **@param** nSex The staff member's sex

\* **@param** nCalendar The staff member's birthday

\* **@param** nHourlyRate The staff member's hourly rate

\*/

**public** Staff(String nLastName, String nFirstName, String nIDNum, **char** nSex, Calendar nCalendar, **double** nHourlyRate) {

lastName = nLastName;

firstName = nFirstName;

idNum = nIDNum;

sex = nSex;

calendar = nCalendar;

hourlyRate = nHourlyRate;

}

/\*\*

\* This sets the staff member's hourly rate

\* **@param** nHourlyRate The staff member's hourly rate

\*/

**public** **void** setHourlyRate(**double** nHourlyRate) {

hourlyRate = nHourlyRate;

}

/\*\*

\* This returns the staff member's hourly rate

\* **@return** Returns the staff member's hourly rate

\*/

**public** **double** getHourlyRate() {

**return** hourlyRate;

}

/\*\*

\* This prints out the staff member's information

\*/

**public** String toString() {

**return** "ID Employee number : " + idNum +

"\nLast Name: " + lastName +

"\nFirst Name: " + firstName +

"\nBirth date: " + calendar.get(Calendar.***MONTH***) + "/" + (calendar.get(Calendar.***DAY\_OF\_MONTH***)) + "/" + (calendar.get(Calendar.***YEAR***) % 100)

+"\nFull Time"

+ "\nMonthly Salary: $" + *df2*.format(monthlyEarning());

}

/\*\*

\* Modifies the employee

\*/

@Override

**public** **void** modifyEmployee(Scanner scan) {

System.***out***.println("Enter last name");

**this**.lastName = scan.next();

System.***out***.println("Enter first name");

**this**.firstName = scan.next();

System.***out***.println("Enter ID number");

**this**.idNum = scan.next();

System.***out***.println("Enter sex");

**this**.sex = scan.next().charAt(0);

Calendar cal = Calendar.*getInstance*();

System.***out***.println("Enter birth year");

**int** year = scan.nextInt();

System.***out***.println("Enter birth month");

**int** month = scan.nextInt();

System.***out***.println("Enter birthday");

**int** day = scan.nextInt();

cal.set(year, month, day);

**this**.calendar = cal;

System.***out***.println("Enter hourly rate");

**this**.hourlyRate = scan.nextDouble();

}

/\*\*

\* This returns the staff member's monthly earnings

\*/

@Override

**public** **double** monthlyEarning() {

**return** hourlyRate \* 160;

}

@Override

**public** String getFirstName() {

// **TODO** Auto-generated method stub

**return** firstName;

}

@Override

**public** **void** setFirstName(String nFirstName) {

// **TODO** Auto-generated method stub

firstName = nFirstName;

}

@Override

**public** String getLastName() {

// **TODO** Auto-generated method stub

**return** lastName;

}

@Override

**public** **void** setLastName(String nLastName) {

// **TODO** Auto-generated method stub

lastName = nLastName;

}

@Override

**public** String getIdNum() {

// **TODO** Auto-generated method stub

**return** idNum;

}

@Override

**public** **void** setIdNum(String nId) {

// **TODO** Auto-generated method stub

idNum = nId;

}

@Override

**public** **char** getSex() {

// **TODO** Auto-generated method stub

**return** sex;

}

@Override

**public** **void** setSex(**char** nSex) {

// **TODO** Auto-generated method stub

sex = nSex;

}

@Override

**public** Calendar getCalendar() {

// **TODO** Auto-generated method stub

**return** calendar;

}

@Override

**public** **void** setCalendar(Calendar nCalendar) {

// **TODO** Auto-generated method stub

calendar = nCalendar;

}

}

**public** **class** Partime **implements** Employee, Serializable{

**protected** String lastName;

**protected** String firstName;

**protected** String idNum;

**protected** **char** sex;

**protected** Calendar calendar = **new** GregorianCalendar();

**protected** **double** hourlyRate;

**private** **int** hoursWorked;

**private** **static** DecimalFormat *df2* = **new** DecimalFormat("#.##");

/\*\*

\* The default Partime constructor

\*/

**public** Partime() {

**super**();

hoursWorked = 0;

}

/\*\*

\* The regular Partime constructor

\* **@param** nLastName The part time worker's last name

\* **@param** nFirstName The part time worker's first name

\* **@param** nIDNum The part time worker's ID number

\* **@param** nSex The part time worker's sex

\* **@param** nCalendar The part time worker's birthday

\* **@param** nHourlyRate The part time worker's pay per hour

\* **@param** nHoursWorked The part time worker's weekly hours

\*/

**public** Partime(String nLastName, String nFirstName, String nIDNum, **char** nSex, Calendar nCalendar, **double** nHourlyRate, **int** nHoursWorked) {

lastName = nLastName;

firstName = nFirstName;

idNum = nIDNum;

sex = nSex;

calendar = nCalendar;

hourlyRate = nHourlyRate;

hoursWorked = nHoursWorked;

}

/\*\*

\* This returns the part time worker's hours per week

\* **@return** Returns the part time worker's hours per week

\*/

**public** **int** getHoursWorked() {

**return** hoursWorked;

}

/\*\*

\* This sets the part time worker's hours per week

\* **@param** nHoursWorked The hours the worker had this week

\*/

**public** **void** setHoursWorked(**int** nHoursWorked) {

hoursWorked = nHoursWorked;

}

/\*\*

\* Prints out the part time worker's information

\*/

**public** String toString() {

**return** "ID Employee number : " + idNum +

"\nLast Name: " + lastName +

"\nFirst Name: " + firstName +

"\nBirth date: " + calendar.get(Calendar.***MONTH***) + "/" + (calendar.get(Calendar.***DAY\_OF\_MONTH***)) + "/" + (calendar.get(Calendar.***YEAR***) % 100) +

"\nHours works per month: " + getHoursWorked() +

"\nMonthy Salary: $" + *df2*.format(monthlyEarning());

}

/\*\*

\* This sets the staff member's hourly rate

\* **@param** nHourlyRate The staff member's hourly rate

\*/

**public** **void** setHourlyRate(**double** nHourlyRate) {

hourlyRate = nHourlyRate;

}

/\*\*

\* This returns the staff member's hourly rate

\* **@return** Returns the staff member's hourly rate

\*/

**public** **double** getHourlyRate() {

**return** hourlyRate;

}

@Override

/\*\*

\* Returns the monthly earnings of the part time worker

\*/

**public** **double** monthlyEarning() {

**return** getHourlyRate() \* hoursWorked \* 4;

}

/\*\*

\* Modifies the employee

\*/

@Override

**public** **void** modifyEmployee(Scanner scan) {

// **TODO** Auto-generated method stub

System.***out***.println("Enter last name");

String lName = scan.next();

**this**.lastName = lName;

System.***out***.println("Enter first name");

**this**.firstName = scan.next();

System.***out***.println("Enter ID number");

**this**.idNum = scan.next();

System.***out***.println("Enter sex");

**this**.sex = scan.next().charAt(0);

Calendar cal = Calendar.*getInstance*();

System.***out***.println("Enter birth year");

**int** year = scan.nextInt();

System.***out***.println("Enter birth month");

**int** month = scan.nextInt();

System.***out***.println("Enter birthday");

**int** day = scan.nextInt();

cal.set(year, month, day);

**this**.calendar = cal;

System.***out***.println("Enter hourly rate");

**this**.hourlyRate = scan.nextDouble();

System.***out***.println("Enter hours worked");

**this**.hoursWorked = scan.nextInt();

}

@Override

**public** String getFirstName() {

// **TODO** Auto-generated method stub

**return** firstName;

}

@Override

**public** **void** setFirstName(String nFirstName) {

// **TODO** Auto-generated method stub

firstName = nFirstName;

}

@Override

**public** String getLastName() {

// **TODO** Auto-generated method stub

**return** lastName;

}

@Override

**public** **void** setLastName(String nLastName) {

// **TODO** Auto-generated method stub

lastName = nLastName;

}

@Override

**public** String getIdNum() {

// **TODO** Auto-generated method stub

**return** idNum;

}

@Override

**public** **void** setIdNum(String nId) {

// **TODO** Auto-generated method stub

idNum = nId;

}

@Override

**public** **char** getSex() {

// **TODO** Auto-generated method stub

**return** sex;

}

@Override

**public** **void** setSex(**char** nSex) {

// **TODO** Auto-generated method stub

sex = nSex;

}

@Override

**public** Calendar getCalendar() {

// **TODO** Auto-generated method stub

**return** calendar;

}

@Override

**public** **void** setCalendar(Calendar nCalendar) {

// **TODO** Auto-generated method stub

calendar = nCalendar;

}

}

**public** **class** Faculty **implements** Employee, Cloneable, Serializable{

**public** **enum** Rank {

***AS***, ***AO***, ***FU***

}

Rank title;

**protected** String lastName;

**protected** String firstName;

**protected** String idNum;

**protected** **char** sex;

**protected** Calendar calendar = **new** GregorianCalendar();

**private** Education facultyDegree = **new** Education();

**private** **static** DecimalFormat *df2* = **new** DecimalFormat("#.##");

/\*\*

\* The default faculty constructor

\*/

Faculty(){

**super**();

}

/\*\*

\* The normal faculty constructor

\* **@param** nLastName The faculty's last name

\* **@param** nFirstName The faculty's first name

\* **@param** nIDnum The faculty's ID Number

\* **@param** nSex The faculty's sex

\* **@param** nCalendar The faculty member's birth day

\* **@param** nTitle The rank of the faculty member

\* **@param** nEducation The education the faculty member has

\*/

Faculty(String nLastName, String nFirstName, String nIDnum, **char** nSex, Calendar nCalendar, Rank nTitle, Education nEducation) {

lastName = nLastName;

firstName = nFirstName;

idNum = nIDnum;

sex = nSex;

calendar = nCalendar;

title = nTitle;

facultyDegree = nEducation;

}

**public** **void** setTitle(Rank nTitle) {

title = nTitle;

}

**public** Rank getTitle() {

**return** title;

}

**public** **void** setEducation(Education nEducation)

{

facultyDegree = nEducation;

}

**public** Education getEducation() {

**return** facultyDegree;

}

/\*\*

\* Print out the faculty's information

\*/

**public** String toString() {

**switch** (title) {

**case** ***AS***:

**return** "ID Employee number : " + idNum +

"\nLast Name: " + lastName +

"\nFirst Name: " + firstName +

"\nBirth date: " + calendar.get(Calendar.***MONTH***) + "/" + (calendar.get(Calendar.***DAY\_OF\_MONTH***)) + "/" + (calendar.get(Calendar.***YEAR***) % 100) +

"\nAssitant Professor" +

"\nMonthly Salary : $" + *df2*.format(monthlyEarning()) +

"\nDegree: " + facultyDegree.getDegree() +

"\nMajor: " + facultyDegree.getMajor() +

"\nResearchers: " + facultyDegree.getResearch();

**case** ***AO***:

**return** "ID Employee number : " + idNum +

"\nLast Name: " + lastName +

"\nFirst Name: " + firstName +

"\nBirth date: " + calendar.get(Calendar.***MONTH***) + "/" + (calendar.get(Calendar.***DAY\_OF\_MONTH***)) + "/" + (calendar.get(Calendar.***YEAR***) % 100) +

"\nAssociate Professor" +

"\nMonthly Salary : $" + *df2*.format(monthlyEarning()) +

"\nDegree: " + facultyDegree.getDegree() +

"\nMajor: " + facultyDegree.getMajor() +

"\nResearchers: " + facultyDegree.getResearch();

**case** ***FU***:

**return** "ID Employee number : " + idNum +

"\nLast Name: " + lastName +

"\nFirst Name: " + firstName +

"\nBirth date: " + calendar.get(Calendar.***MONTH***) + "/" + (calendar.get(Calendar.***DAY\_OF\_MONTH***)) + "/" + (calendar.get(Calendar.***YEAR***) % 100) +

"\nFull Time Professor" +

"\nMonthly Salary : $" + *df2*.format(monthlyEarning()) +

"\nDegree: " + facultyDegree.getDegree() +

"\nMajor: " + facultyDegree.getMajor() +

"\nResearchers: " + facultyDegree.getResearch();

**default**:

**return** "";

}

}

/\*\*

\* Creates a deep copy of the Faculty object

\*/

**public** Object clone() **throws** CloneNotSupportedException

{

Faculty f = (Faculty) **super**.clone();

setLastName(f.getLastName());

setFirstName(f.getFirstName());

setIdNum(f.getIdNum());

setSex(f.getSex());

setCalendar(f.getCalendar());

setTitle(f.getTitle());

setEducation(f.getEducation());

**return** f;

}

@Override

/\*\*

\* Returns the monthly earnings of the faculty member

\*/

**public** **double** monthlyEarning() {

**switch** (title) {

**case** ***AS***:

**return** EmployeeInfo.***FACULITY\_MONTHLY\_SALARY***;

**case** ***AO***:

**return** EmployeeInfo.***FACULITY\_MONTHLY\_SALARY*** \* 1.5;

**case** ***FU***:

**return** EmployeeInfo.***FACULITY\_MONTHLY\_SALARY*** \* 2;

**default**:

**return** 0;

}

}

/\*\*

\* Modifies the employee

\*/

@Override

**public** **void** modifyEmployee(Scanner scan) {

// **TODO** Auto-generated method stub

System.***out***.println("Enter last name");

**this**.lastName = scan.next();

System.***out***.println("Enter first name");

**this**.firstName = scan.next();

System.***out***.println("Enter ID number");

**this**.idNum = scan.next();

System.***out***.println("Enter sex");

**this**.sex = scan.next().charAt(0);

Calendar cal = Calendar.*getInstance*();

System.***out***.println("Enter birth year");

**int** year = scan.nextInt();

System.***out***.println("Enter birth month");

**int** month = scan.nextInt();

System.***out***.println("Enter birthday");

**int** day = scan.nextInt();

cal.set(year, month, day);

**this**.calendar = cal;

**boolean** correctTitle = **false**;

**while**(!correctTitle) {

System.***out***.println("Set Title");

String title = scan.next();

**if** (title.equalsIgnoreCase("AS"))

{

**this**.title = Rank.***AS***;

correctTitle = **true**;

}

**else** **if**(title.equalsIgnoreCase("AO"))

{

**this**.title = Rank.***AO***;

correctTitle = **true**;

}

**else** **if**(title.equalsIgnoreCase("FU"))

{

**this**.title = Rank.***FU***;

correctTitle = **true**;

}

**else**

System.***out***.println("Invalid choice try again");

}

System.***out***.println("Set Degree");

String degree = scan.next();

System.***out***.println("Set Major");

String major = scan.next();

System.***out***.println("How many researchers");

**int** researchers = scan.nextInt();

**this**.facultyDegree = **new** Education(degree, major, researchers);

}

@Override

**public** String getFirstName() {

// **TODO** Auto-generated method stub

**return** firstName;

}

@Override

**public** **void** setFirstName(String nFirstName) {

// **TODO** Auto-generated method stub

firstName = nFirstName;

}

@Override

**public** String getLastName() {

// **TODO** Auto-generated method stub

**return** lastName;

}

@Override

**public** **void** setLastName(String nLastName) {

// **TODO** Auto-generated method stub

lastName = nLastName;

}

@Override

**public** String getIdNum() {

// **TODO** Auto-generated method stub

**return** idNum;

}

@Override

**public** **void** setIdNum(String nId) {

// **TODO** Auto-generated method stub

idNum = nId;

}

@Override

**public** **char** getSex() {

// **TODO** Auto-generated method stub

**return** sex;

}

@Override

**public** **void** setSex(**char** nSex) {

// **TODO** Auto-generated method stub

sex = nSex;

}

@Override

**public** Calendar getCalendar() {

// **TODO** Auto-generated method stub

**return** calendar;

}

@Override

**public** **void** setCalendar(Calendar nCalendar) {

// **TODO** Auto-generated method stub

calendar = nCalendar;

}

}

**public** **class** EmployeeFactory **implements** Serializable{

**public** ArrayList<Employee> empFact= **new** ArrayList<Employee>();

**public** Employee getEmployee(String employeeType) {

**if** (employeeType.equalsIgnoreCase("FACULTY"))

**return** **new** Faculty();

**else** **if** (employeeType.equalsIgnoreCase("STAFF"))

**return** **new** Staff();

**else** **if** (employeeType.equalsIgnoreCase("PARTIME"))

**return** **new** Partime();

**return** **null**;

}

**public** **void** addEmployee(Scanner scanner) **throws** FileNotFoundException, ClassNotFoundException, IOException {

**boolean** quit = **false**;

**while**(!quit)

{

System.***out***.println("What employee are you adding to the list? ");

System.***out***.println("Hit 1 for Faculty, 2 for Partime, 3 for Staff\nand any oher number to quit");

**int** choice = scanner.nextInt();

Employee emp = **null**;

**switch** (choice) {

**case** 1:

emp = **new** EmployeeFactory().getEmployee("Faculty");

emp.modifyEmployee(scanner);

empFact.add(emp);

**break**;

**case** 2:

emp = **new** EmployeeFactory().getEmployee("Partime");

emp.modifyEmployee(scanner);

empFact.add(emp);

**break**;

**case** 3:

emp = **new** EmployeeFactory().getEmployee("Staff");

emp.modifyEmployee(scanner);

empFact.add(emp);

**break**;

**default**:

quit = **true**;

**break**;

}

}

}

}