# FHI: Family Health Information

e.g., PANTRACK: A System for Tracking Pandemics in Iceland

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# Assignment 1 5/8/2023

For this assignment, you will describe and implement release 1 of your term project. You will incorporate *an abstract class*, *inheritance*, *upcasting or downcasting*, and *polymorphism*. You are free to choose a project that interests you but if you prefer, the instructor and your facilitator will be happy to suggest a topic. If you are already an experienced developer, this is an opportunity to build a challenging application (check with your facilitator if it requires significant API’s) or discuss research with the instructor. It is OK to name a project with much more scope than you can accomplish in the course (as in the example above): we will not hold you to completing everything associated with it. What we do expect is that you specify and implement a set of do-able requirements within such scope.

Submit this completed Word document. Replace as indicated. Please observe and retain the gray text. Your materials—in black 12-point Times New Roman—should not exceed 5 pages excluding references, figures, and appendices. Use the Appendix sections for additional material if you need to. These will be read only on an as-needed basis.

We want you to develop in Eclipse preferably or else IntelliJ (talk to your facilitator about exceptions). As you code, use JUnit tests whenever possible but certainly by week 2—package-by-package, class-by-class, and method-by-method, except for trivial methods and those requiring I/O. Use non-Junit classes for testing the latter. Keep the evaluation criteria in mind, listed at the end.

For this assignment, you do not need to read data from a file—you can build all data into the code if you wish.

Include a ReadMe file describing where to run the application from, and including necessary execution notes. All JUnit tests will be assumed runnable.

You are encouraged to leverage an AI generator as much as possible in completing this assignment unless you request an exemption in advance (which will probably be granted). You will be evaluated on your value added, as per the evaluation criteria. For every section “>>>AI generation …”, please check “I did not …” or (preferably) expand it (click the black arrowhead at left), provide the contents, then collapse the sections (again, using the arrowhead).

# 1 SUMMARY DESCRIPTION

One- or two-paragraph overall description of your proposed term project—half-page (12-point Times New Roman) limit. By the end, term projects will incorporate most of the techniques discussed in the course. To do this, you may need to alter the direction of your project or introduce an additional project in future. You may alter this or even replace it as the semester progresses. You will probably find it useful to use your project acronym.

### Managing the health information of an entire family can be challenging, especially when it comes to keeping track of various readings over time. That’s why I have decided to build a java project to help me and my family to keep track of our health readings through an app. The FHI "Family health information" Java project is a java software application that helps our families manage their health information in a centralized database. It will help members to keep track of their health over time. The application is built using Java Object-Oriented Programming, basic JavaFX, and Java Database Connectivity. The user interface is designed using JavaFX, which provides a sleek and intuitive design for the user to interact with. The Java Database Connectivity allows the application to interact with a database to store and retrieve health information. The object-oriented programming from java along with database concurrency will help organize the code and keep it stable.

### The application provides the user with the ability to add, remove, and update users and groups of users(family). The users can be identified as part of a family, which makes it easy to manage the health information for a whole family in one centralized location. The user can add different types of health information, including BMI, blood pressure, diabetes, cholesterol, and more, and track the data over time by associating a date with each entry. The application also allows the user to store and update health information for each individual user in a database, which makes it easy to manage the information and access it from multiple devices. The "Family health information" Java project is a powerful tool for my family and relatives to manage their health information in a secure and efficient manner.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

The AI response was great as a starting point for my project. It gave me a strong idea of what my project can achieve and what improvements can be made. As a human being, I can utilize this and mix my own ideas and creativity to come up with a more efficient and productive app. Using a well-versed prompt helped me to get as much accurate information as the AI could generate about the project. However, modified the response to make it clear that the app will be more of a personal health info storage system rather than a large-scale app. This is because I am unsure about in what extent I can provide security to these sensitive public health data. Additionally, I can also incorporate my unique experience and functionalities into the system to better suit the app towards my own preferences. Overall, my own perspective and creativity will be biggest value added to this AI generated material.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

I want to create a "Family health information" Java project. I would like it to have the following capabilities at least:

1. Be able to add/remove/update users/groups of users and identify them as a family

2. Be able to insert health information with the date for each individual.

3. Be able to store/update information for users per family in a database

To do these, I may require a basic GUI or just use prompts.

[2]

Using java Object-oriented programming, JavaFX, and java database connectivity, can you generate a two paragraphs description of my term project "Family health information"?

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

cchatGPT:  
The "Family health information" Java project is a software application that helps families manage their health information in a centralized database. The application is built using Java Object-Oriented Programming, JavaFX, and Java Database Connectivity. The user interface is designed using JavaFX, which provides a sleek and intuitive design for the user to interact with. The Java Database Connectivity allows the application to interact with a database to store and retrieve health information.

The application provides the user with the ability to add, remove, and update users and groups of users. The users can be identified as part of a family, which makes it easy to manage the health information for a whole family in one centralized location. The user can add different types of health information, including BMI, blood pressure, diabetes, cholesterol, and more, and track the data over time by associating a date with each entry. The application also allows the user to store and update health information for each user in a database, which makes it easy to manage the information and access it from multiple devices. The "Family health information" Java project is a powerful tool for families to manage their health information in a secure and efficient manner.

## 2 I/O EXAMPLE FROM *PROJECTED* COMPLETED PROJECT *EVALUATION CRITERION (i) APPLIES*

Provide an example of projected *concrete* output for designated input. You will not be held to fulfilling exactly this—it is just explanatory at this point, to indicate where your project is going. We recognize that project direction and details will change as the term progress. This section refers to the project as a whole, not just to what you will produce this week, so we can gain an idea of what you have in mind overall.

Let's say you have a family consisting of three people - John, Jane, and their son Jack. When John joins the app as a user, he can assign him to the "Smith Family" group (unless the same family already exists in the db) and set a password for his family. Then, when he adds Jane and Jack as users, he can also assign them to the same "Smith Family" group. This way, the app knows that John, Jane, and Jack all belong to the same family group, and their health information will be stored together in the same database. They can also login using the family name and password and view all the information.

So, when I add a new health reading for John, the app will know to store that information in the database associated with the "Smith Family" group. And when I can view the health information for the entire family, the app will pull all the data associated with the "Smith Family" group and display it together.

This is just one potential example of how the app may be used.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

The AI thoughtfully evaluated my prompt and provided an example of input output. It described how the app will ask for user input to basically store individuals as part of a group and then it will ask for health information from the user and output the status. It is a great example of the i/o for my projected completed FHI project. However, I can certainly see how my own perspective will modify this example already. I may make sure that the “Smith Family” group already exits or not. That’s why I would make sure at the beginning of account creation, I ask for the name of a family that user wants to be recorded as. Additionally, I could check if that family already existed in the db. If so, I will make the app redirect the user to that family and they can add themselves from that family group page. That’s just one way of how I can add value to this AI generated material.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

For example, I added John, Jane, and Jack as members of the "Smith Family". Can you provide some examples i/o about this family from the family health information app?

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

chatGPT:

Here’s an example of input/output:  
Input:

User selects "Smith Family" group

User selects "Add member" function

User inputs "Emily Smith" and presses "Add"

Output:

The app adds "Emily Smith" to the "Smith Family" group and displays a confirmation message

Input:

User selects "Smith Family" group

User selects "View members" function

Output:

The app displays a list of members in the "Smith Family" group, including John, Jane, Jack, and Emily Smith

Input:

User selects "Smith Family" group

User selects "Add health information" function

User inputs "John Smith" and selects "BMI" from the list of health metrics

User inputs "25.3" for John's BMI and selects "Save"

Output:

The app adds John's BMI reading to the "Smith Family" group and displays a confirmation message

Input:

User selects "Smith Family" group

User selects "View health information" function

User selects "John Smith" from the list of family members

The app displays a graph of John's BMI readings over time

## 3 REQUIREMENTS IMPLEMENTED IN THIS RELEASE

Supply [functional requirements](https://docs.google.com/document/d/1eU7eINLDxmrf793D4OF2yGT4ry_SW3GQGoVDYzecGHc/edit?usp=sharing) statement that you accomplished for this assignment, i.e., functionality that the application provides for the user. Please state requirement in declarative form, as illustrated in the examples, because here we want to know the functionality intended (*what*, not *how*). For example, the following is *not* a proper functional requirement: *TicTac will have a class for O’s and a class for X’s.* It is common to mistake design elements like this for requirements. To get started, state what the application will accept as input, like requirement 3.1 below.

Keep in mind that the implementation of your requirements will incorporate *an abstract class*, *inheritance*, *upcasting or downcasting*, and *polymorphism*; that will probably influence the requirements you choose to implement in this assignment.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

The chatGPT response based on my prompt was quite satisfactory as a starting point. It definitely helped me to bound my thought process to focus on the one requirement of adding users and familygroup. However, it I needed to step up and modify it such that the requirements follow the functional requirement guideline provided in the section. With that modification, I believe I added a significant value to the AI response to create a solid, clear, and functional requirement for my FHI project.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

For my “Family health information” app can you generate one functional requirement (what the app shall be able to do, not how to) that should will incorporate an abstract class, inheritance, upcasting or downcasting, and polymorphism.

[2]

can this requirement have abstract class, upcasting, downcasting?

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

chatGPT:  
[1] 3.1 Implementing User and FamilyGroup Classes Using Inheritance and Polymorphism

The application should implement User and FamilyGroup classes using inheritance and polymorphism. The User class should have attributes such as name, age, and unique identifier. The FamilyGroup class should have attributes such as name, unique identifier, and a list of users. The application should allow the user to create new instances of User and FamilyGroup classes. Users can be added to an existing FamilyGroup instance or a new FamilyGroup instance can be created. The application should use polymorphism to allow for the addition or removal of users from a FamilyGroup instance.

[2] Yes, it is possible to incorporate abstract class, upcasting, and downcasting in this requirement. Here is an example of how it could be done:

3.1 Adding Users and Creating Family Groups

The application should allow the user to add new users and create family groups. Each user should have a name, age, and unique identifier. Users can be added to an existing family group or a new family group can be created. Family groups should have a name and a unique identifier. Once created, family groups can have users added or removed as necessary.

To implement this requirement, an abstract class "FamilyMember" can be created with attributes such as name, age, and unique identifier. Subclasses such as "User" and "FamilyGroup" can then be created that inherit from the "FamilyMember" abstract class. Upcasting can be used to assign a subclass object to a superclass reference variable, such as adding a "User" object to a "FamilyMember" array. Downcasting can be used to assign a superclass object to a subclass reference variable, such as casting a "FamilyMember" object to a "User" object in order to access its specific methods. This allows for flexibility in the program and easier management of family members and groups.

Continue with at most two more requirements.

## 3.1 Adding Users and Creating Family Groups

## The application shall ask the user for account information in command prompt or Gui. It shall be able to register user’s name, age, email, and assign a unique id. It shall also allow the user to add them to an existing family group or create a new family group. The application should allow users to either login to an existing family or create a new one. When a user logs in to an existing family, they should be prompted to provide the family name and password. When a new user wants to sign up, they must provide their name, age, email, family name, and family password.

## 3.2 Recording Health Information

## The application should allow the user to record health information for each user in the system. The user should be able to input different types of health information, such as BMI, blood pressure, diabetes, cholesterol, and more. Each health record should have a date associated with it. One member of a family should be able to record health readings for any member of that family.

## 3.3 Accessing and Updating Health Information

## The application should allow the user to access and update health information for each user in the family. The user should be able to view the most recent health records and update them if necessary. The system should also provide a way to view a history of all health records for each user. Health information should be stored securely and only accessible to authorized users.

## 4 ILLUSTRATIVE OUTPUT FROM IMPLEMENTATION

### Provide illustrative output from your implemented application (so far) showing that the requirements have been met. Explain what class.method(s) produce it.

Your response should replace this.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

Your response replaces this.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

A copy of your first prompt replaces this.

[2]

etc.

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

Your response replaces this.

## 5 YOUR DIRECTORY

### Show a screenshot of your directory. This should include a parallel directory of JUnit tests where possible—package-by-package, class-by-class, and method-by-method, except for trivial ones.

Your response should replace this.

## 6 TECHNIQUES IMPLEMENTED

Your implementation should include *inheritance*, *polymorphism*, and *either an abstract class or interface* at least once, and in a manner that is useful to your application. Explain where and how you applied these, using the headings below.

### 6.1 Class model and Sequence Diagram

Identify where you included *inheritance*, *polymorphism*, and *abstract classes* or *interfaces* in your class model. Make classes and members *static* or not as per their intended usage. To do this use tools (e.g., Visio, Lucidchart, or draw.io), PowerPoint, or a combined model as in [this example](https://docs.google.com/spreadsheets/d/1wnua9en_nwBITm-pNiQTn7QzP1ylu9LK2QJeELa2GrA/edit?usp=sharing) (which you are free to cut and paste from). Insert indications in red to show where the three features below apply.

Chart

Description automatically generated

Diagram

Description automatically generated with medium confidence

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

It was really helpful to have the AI write the code for me. However, after reviewing the code, I modified it slightly to meet my perspective of the abstract class. I added two methods that are also abstract named addMember and getHealthInfo. Also, I had to include the package info to the code.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

Write An abstract class name Person with name, age, email, id parameters in java.

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_chatGPT\_

**public** **abstract** **class** Person {

**private** String fullName;

**private** **int** age;

**private** String email;

**private** **long** id;

**public** Person(String fullName, **int** age, String email, **long** id) {

**super**();

**this**.fullName = fullName;

**this**.age = age;

**this**.email = email;

**this**.id = id;

}

**public** String getFullName() {

**return** fullName;

}

**public** **void** setFullName(String fullName) {

**this**.fullName = fullName;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** String getEmail() {

**return** email;

}

**public** **void** setEmail(String email) {

**this**.email = email;

}

**public** **long** getId() {

**return** id;

}

**public** **void** setId(**long** id) {

**this**.id = id;

}

}

### 6.2 Code showing an abstract class or interface

Show the relevant code (only) and explain why an abstract class or interface is appropriate here. It should be clear where the code is located (class and method).

The Person class is defined as abstract and therefore it cannot be instantiated. It has some default methods and fields. Classes that extend to Person class can be instantiated and use the methods of Person class. Even though some methods could have been left unimplemented here, I implemented most of them. The two unimplemented methods must be implemented in the subclasses.

**package** Hw1;

**public** **abstract** **class** Person {

**private** String fullName;

**private** **int** age;

**private** String email;

**private** **long** id;

**public** Person(String fullName, **int** age, String email, **long** id) {

**super**();

**this**.fullName = fullName;

**this**.age = age;

**this**.email = email;

**this**.id = id;

}

**public** String getFullName() {

**return** fullName;

}

**public** **void** setFullName(String fullName) {

**this**.fullName = fullName;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** String getEmail() {

**return** email;

}

**public** **void** setEmail(String email) {

**this**.email = email;

}

**public** **long** getId() {

**return** id;

}

**public** **void** setId(**long** id) {

**this**.id = id;

}

**public** **abstract** **void** addMember(Person person);

**public** **abstract** String getHealthInfo();

}

### >>>AI generation OR check: *I did not use AI generation here* \_NO\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

Your response replaces this.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

A copy of your first prompt replaces this.

[2]

etc.

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

Your response replaces this.

### 6.3 Code showing polymorphism

Show the relevant code (only) and explain why *polymorphism* is appropriate here. Recall that polymorphism is implemented in one of two ways – overriding methods in subclasses or overloading methods in the same class where the method signatures are different – and allowing the language runtime to dynamically invoke the correct method. It should be clear where the code is located (class and method).

I am using polymorphism in both User and Family class. For space purpose, I will only put the User class code here. You can find the Family class code in the code files.  
  
**package** Hw1;

**public** **class** User **extends** Person {

**private** String familyName;

**private** String familyPassword;

**public** User(String fullName, **int** age, **long** id, String email, String familyName, String familyPassword) {

**super**(fullName, age, email, id);

**this**.familyName = familyName;

**this**.familyPassword = familyPassword;

}

@Override

**public** **void** addMember(Person p) {

// implementation here

}

@Override

**public** String getHealthInfo() {

// implementation here

**return** "";

}

**public** **void** logIn() {

};

// getters and setters

**public** String getFamilyName() {

**return** familyName;

}

**public** **void** setFamilyName(String familyName) {

**this**.familyName = familyName;

}

**public** String getFamilyPassword() {

**return** familyPassword;

}

**public** **void** setFamilyPassword(String familyPassword) {

**this**.familyPassword = familyPassword;

}

}  
In the User class code above, the two methods  
 @Override

**public** **void** addMember(Person p) {

// implementation here

}

@Override

**public** String getHealthInfo() {

// implementation here

**return** "";

}

Signifies the polymorphism(taking many forms). The User class is overriding the base class’s two methods. The two same methods were also overridden in the family class.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

Gave me a handy example—but I had to strip off extra example codes because I only needed one or two lines to show downcasting. I then also put a sysout statement to prove the downcasting worked.

(2) MY PROMPT SEQUENCE (ONLY)

[1] how can I show downcasting here with Person, User, and Family?

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_chatGpt\_\_

Person person1 = new User("John Smith", 30, "johnsmith@email.com", 1234, "Smith", 5678);

// Downcast person1 to a User

User user1 = (User) person1;

// Access User-specific field

String familyName = user1.getFamilyName();

// Downcast person1 to a Family

Family family1 = (Family) person1;

// Access Family-specific field

String[] members = family1.getMembers();

### 6.4 Code showing upcasting or downcasting

Show the relevant code (only) and explain why upcasting or downcasting is appropriate here. It should be clear where the code is located (class and method).

Here is one example of where I can use down casting. It might change later,  
**import** java.util.List;

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

**public** **static** **void** main(String[] args) {

Person person1 = **new** User("John Smith", 30, 1234, "johnsmith@email.com", "Smith", 5678);

// Downcast person1 to a User

User user1 = (User) person1;

// Access User-specific field

String familyName = user1.getFamilyName();

System.***out***.println(familyName);

}

}

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

Your response replaces this.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

A copy of your first prompt replaces this.

[2]

etc.

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

Your response replaces this.

## 7 YOUR CODE

Unless your facilitator requests another method, copy your Eclipse project to your file system, zip it, and attach it. Please contact your facilitator in advance if you want to request an alternative means.

Your response should replace this.

### >>>AI generation OR check: *I did not use AI generation here* \_\_(Please collapse this before submitting.)

(1) PARAGRAPH DESCRIBING YOUR VALUE ADDED TO THE AI-GENERATED MATERIAL

Your response replaces this.

(2) MY PROMPT SEQUENCE (ONLY)

[1]

A copy of your first prompt replaces this.

[2]

etc.

(3) CODE OR TEXT PRODUCED BY THE ABOVE PROMPT SEQUENCE

chatGPT\_\_ CODEX\_\_OTHER (please specify)\_\_\_

Your response replaces this.

## 8 EVALUATION OF ASSIGNMENT 1



## Appendix 1 (if needed; should be referenced above, and will be read as-needed only)

## Appendix 2 (if needed; should be referenced above, and will be read as-needed only)