| Logoslogo | **Institiúid Teicneolaíochta, Trá Lí**  **INSTITUTE OF TECHNOLOGY TRALEE**  **CA 2016**    **Object Oriented Programming 3** |
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**Duration of Exam:** 1 Hour 40 Minutes

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**Instructions to Candidates: Disconnect your computer from the network.** It is your responsibility to submit all source code to the exam supervisor. Create a folder on the desktop named after yourself and place all source code in the folder (Use the source folder as your workspace in eclipse). **Important: After you have submitted your code, reconnect the computer to the network and copy your folder to the x: drive.**

**Note: 10 marks** are awarded for writing clean code: proper indentation, comments, naming convention, methods, coding style/efficiency, etc

**Question 1**

Consider the following UML inheritance hierarchy diagram:



1. Write the full java code for the interface *Person* (5 marks)
2. Write the full java code for the *Player class.* **Player** is an **abstract class.** Ithas appropriate **abstract methods** corresponding to the Interface requirements. It does **not** have any **concrete accessor/mutators** methods. It has a **multi-argument constructor**, a **no-argument constructor** and a **toString**() method for displaying the attributes of a Player. (15 marks)
3. Write the code for the Footballer class. You should include an appropriate constructor and toString method, making use of the java principle of code reuse wherever possible. (10 marks)
4. Write the code for a driver class that creates a collection of Footballers, prompting the user to input the appropriate details. No duplicates are allowed. You should use a loop structure to cater for creating additional Footballers in your collection. (15 marks)
5. Use an iterator to scan through the collection and display the collection in a single message box. (10 marks)
6. Create a method (that accepts the collection as an argument) that acts as a filter that displays all footballers over 30 years of age. (10 marks)
7. Create two additional classes that allow the collection to be sorted in descending order of age and alphabetically. (15 marks)
8. Modify the driver class to sort and display in a two separate message boxes the collection of footballers both by age and alphabetically. (10 marks)