COMP2396B Tutorial 6

**OOP, Inheritance, Interface**

Question 1

Ditto is a special Pokémon that can transform into other forms such as Pikachu and Squirtle. A Pikachu can release electricity. A Squirtle can spray water.

Given: Main.java and ShinyDitto.java

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| **public** **class** Main {  **private** **static** **void** toPikachu(Pikachu pkm) {  pkm.releaseElectricity();  }  **private** **static** **void** toSquirtle(Squirtle pkm) {  pkm.sprayWater();  }  **public** **static** **void** main(String[] args) {  Ditto pkm = **new** ShinyDitto();  *toPikachu*(pkm);  *toSquirtle*(pkm);  }  } | **public** **class** ShinyDitto **extends** Ditto {  **public** **void** releaseElectricity() {  System.***out***.println("ShinyDitto releasing  electricity!");  }  **public** **void** sprayWater() {  System.***out***.println("ShinyDitto spraying  water!");  }  } |

Output:

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| ShinyDitto releasing electricity!  ShinyDitto spraying water! |

Your task: Design the interfaces Pikachu, Squirtle, and all required classes.

Question 2

Basketball is a team sport and ball game. Different basketball activities have different team size and ball size.

Given: Main.java, Sports.java

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| **import** java.io.\*;  **public** **class** Main {  **public** **static** **void** main(String[] args) **throws** IOException {  Basketball womenBasketball = **new** Basketball("womenBasketball");  womenBasketball.setBallSize(11.3, 600.0);  womenBasketball.setTeamSize(5);  System.***out***.println("The team size of " + womenBasketball.getName() + " is " + womenBasketball.getTeamSize() + ".");  System.***out***.println("The radius of the ball of" + womenBasketball.getName() + " is " + womenBasketball.getBallRadius() + " cm.");  System.***out***.println("The weight of the ball of" + womenBasketball.getName() + " is " + womenBasketball.getBallWeight() + " g.");  Basketball men3x3 = **new** Basketball("men3x3", 12.3, 650.0, 3);  System.***out***.println("The team size of " + men3x3.getName() + " is " + men3x3.getTeamSize() + ".");  System.***out***.println("The radius of the ball of" + men3x3.getName() + " is " + men3x3.getBallRadius() + " cm.");  System.***out***.println("The weight of the ball of" + men3x3.getName() + " is " + men3x3.getBallWeight() + " g.");  }  } |
| **public** **class** Sports {  String name;  **public** Sports(String name) {  **this**.name = name;  }  **public** String getName() {  **return** name;  }  } |

Output:

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| The team size of womenBasketball is 5.  The radius of the ball of womenBasketball is 11.3 cm.  The weight of the ball of womenBasketball is 600.0 g.  The team size of men3x3 is 3.  The radius of the ball of men3x3 is 12.3 cm.  The weight of the ball of men3x3 is 650.0 g. |

You ara required to implement two interfaces: Ballgames.java with method TeamSports.java, and a class Basketball which extends Sports and implements Ballgames and TeamSports.

BallGames.java:

Method:

setBallSize: Arguments: radius, weight .

TeamSports.java

Method:

setTeamSize: Arguments: teamSize.

Basketball.java

Variables:

double radius;

double weight;

int teamSize;

Constructors:

1. Set name.
2. Set name, radius, weight, teamSize.

Method:

implement BallGames and TeamSports methods.

getBallRadius().

getBallWeight().

getTeamSize().

Sample solution

Question 1:

Pikachu.java

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| **public** **interface** Pikachu {  **public** **void** releaseElectricity();  } |

Squirtle.java

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| --- |
| **public** **interface** Squirtle {  **public** **void** sprayWater();  } |

Ditto.java

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| --- |
| **public** **class** Ditto **implements** Pikachu, Squirtle {  **public** **void** releaseElectricity() {  System.***out***.println("Ditto releasing electricity!"); // optional  }  **public** **void** sprayWater() {  System.***out***.println("Ditto spraying water!"); // optional  }  } |

Question 2

BallGames.java

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| --- |
| **public** **interface** BallGames {  **public** **void** setBallSize(**double** radius, **double** weight);  } |

TeamSports.java

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| --- |
| **public** **interface** TeamSports {  **public** **void** setTeamSize(**int** size);  } |

Basketball.java

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| --- |
| **public** **class** Basketball **extends** Sports **implements** TeamSports, BallGames {  **double** radius;  **double** weight;  **int** teamSize;  **public** Basketball(String name) {  **super**(name);  }  **public** Basketball(String name, **double** radius, **double** weight, **int** teamSize) {  **super**(name);  **this**.radius = radius;  **this**.weight = weight;  **this**.teamSize = teamSize;  }  @Override  **public** **void** setBallSize(**double** radius, **double** weight) {  **this**.radius = radius;  **this**.weight = weight;  }  @Override  **public** **void** setTeamSize(**int** teamSize) {  **this**.teamSize = teamSize;  }  **public** **double** getBallRadius() {  **return** radius;  }  **public** **double** getBallWeight() {  **return** weight;  }  **public** **int** getTeamSize() {  **return** teamSize;  }  } |