INFO1113 Object-Oriented Programming

Week 12B: Revision Part 2

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Examination Topics

- Simple class inheritance
- Interfaces and abstract classes
- UML Class Hierarchy Diagrams
- Instance and static variables
- Collections and Enums
- Recursion
- Wildcards
- Generics and Type Bounds
- Overloading and Overriding
- Testing

Review Material

```
/** An enumeration of card suits. */
enum Suit
{
    CLUBS("black"), DIAMONDS("red"), HEARTS("red"),
    SPADES("black");

    private final String color;

    private Suit(String suitColor)
    {
        color = suitColor;
    }
    public String getColor()
    {
        return color;
    }
}
```

If cardSuit is an instance of Suit and is assigned the value Suit.SPADES, what is returned by each of the following expressions?

a. System.out.println(cardSuit.ordinal())

3

Review Material

```
/** An enumeration of card suits. */
enum Suit
{
    CLUBS("black"), DIAMONDS("red"), HEARTS("red"),
    SPADES("black");

    private final String color;

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}
```

If cardSuit is an instance of Suit and is assigned the value Suit.SPADES, what is returned by each of the following expressions?

a. System.out.println(cardSuit.ordinal()) 3

b. System.out.println(cardSuit.equals(Suit.CLUBS)) false

Review Material

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/** An enumeration of card suits. */
enum Suit
{
    CLUBS("black"), DIAMONDS("red"), HEARTS("red"),
    SPADES("black");

    private final String color;

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a. System.out.println(cardSuit.ordinal()) 3

b. System.out.println(cardSuit.equals(Suit.CLUBS)) false

c. System.out.println(cardSuit.getColor()) black

Review Material

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/** An enumeration of card suits. */
enum Suit
{
    CLUBS("black"), DIAMONDS("red"), HEARTS("red"),
    SPADES("black");

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    public String getColor()
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```

If cardSuit is an instance of Suit and is assigned the value Suit.SPADES, what is returned by each of the following expressions?

a. System.out.println(cardSuit.ordinal())	3
b. System.out.println(cardSuit.equals(Suit.CLUBS))	false
c. System.out.println(cardSuit.getColor())	black
d. System.out.println(cardSuit)	SPADES

Review Material

Write a program that allows user to enter the marks of the students using standard I/O. Store all the marks in an ArrayList and print the average mark of the students.

The inputted mark must be between 0 and 100. In case, the mark is out of bound, throw a InvalidMarkException. When a InvalidMarkException is thrown, the getMessage() should return “Invalid Mark.” You need to have appropriate catch block for any other exceptions.

Review Material

```
class InvalidMarkException extends Exception{

   public InvalidMarkException(){

      super("Invalid Mark.");

   }

}
```

```
public class UnderstandingException{
   public static void main(String[] args){

      ArrayList<Integer> marks = new ArrayList<>();
      Scanner scan = new Scanner(System.in);
      int SumOfMarks = 0;

      try{
         while(scan.hasNext()){
            int mark = scan.nextInt();
            if(mark < 0 || mark > 100)
               throw new InvalidMarkException();
            else {
               marks.add(mark);
               SumOfMarks += mark;
            }
         }

         System.out.println(SumOfMarks/marks.size());

      }catch(InvalidMarkException e){
         System.out.println(e.getMessage());
      }catch(Exception e){
         e.printStackTrace();
      }
   }
}
```

Review Material

Find the errors. Specify the line numbers and mention the corrections required

```
1.  public class PrintMax {
2.      public static void main(String args) {
3.          int a = args.size();
4.          int max = 0;
5.          for (int i; i < a; ++i) {
6.              if (args[i] > max)
7.                  max = args[i]);
8.              else
9.                  max = max;
10.         }
11.         System.out.println(max);
12.     }
13. }
```

Review Material

Find the errors. Specify the line numbers and mention the corrections required

```
1.  public class PrintMax {
2.      public static void main(String args) {   →   public static void main(String[] args) {
3.          int a = args.size();                 →   int a = args.length;
4.          int max = 0;
5.          for (int i; i < a; ++i) {            →   for (int i = 0; i < a; ++i) {
6.              if (args[i] > max)               →   if (Integer.parseInt(args[i]) > max)
7.                  max = args[i]);              →   max = Integer.parseInt(args[i]);
8.              else
9.                  max = max;
10.         }
11.         System.out.println(max);
12.     }
13. }
```

Review Material

Create an abstract class *PayCalculator* that has an attribute payRate given in dollars per hour. The class should have an abstract method computePay(hours) to return the pay for a given amount of time.

Derive a class *RegularPay* from *PayCalculator*. It should have a constructor that has a parameter for the payRate. It should implement the computePay(hours) method which returns the pay for a given amount of time.

Review Material

Create an abstract class *PayCalculator* that has an attribute payRate given in dollars per hour. The class should have an abstract method computePay(hours) to return the pay for a given amount of time.

Derive a class *RegularPay* from *PayCalculator*. It should have a constructor that has a parameter for the payRate. It should implement the computePay(hours) method which returns the pay for a given amount of time.

```
abstract class PayCalculator{
    double payRate;
    public abstract double computePay(double hours);
}

class RegularPay extends PayCalculator{
    public RegularPay(double payRate){
        this.payRate = payRate;
    }
    public double computePay(double hours){
        return hours * payRate;
    }
}
```

Review Material

Consider the following FamilyMember class. Write a recursive procedure to count the number of leaf nodes (family members with no children) in the family tree.

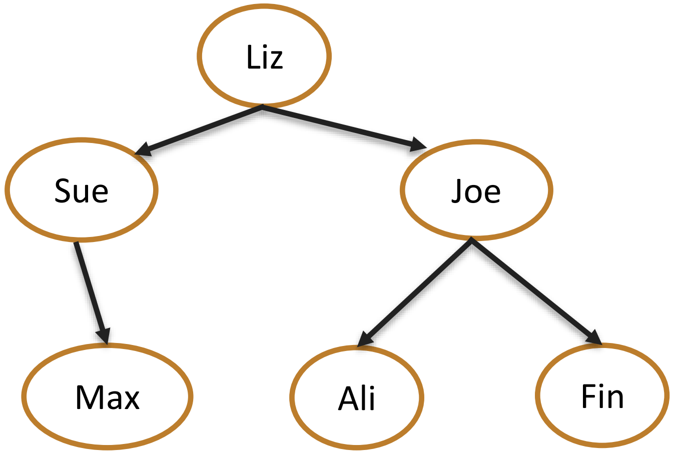
```
class FamilyMember {

    String name;
    List<FamilyMember> children;

    public FamilyMember(String name) {
        this.name = name;
        children = new ArrayList<>();
    }

    public void addChildren(FamilyMember f){
        children.add(f);
    }

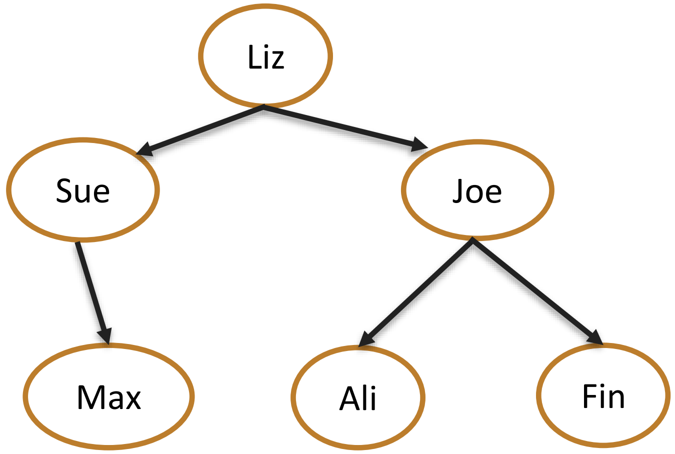
    public int countLeaf() {
        //your implementation here
    }
}
```



Review Material

```
class FamilyMember {
    String name;
    List<FamilyMember> children;

    public FamilyMember(String name) {
        this.name = name;
        children = new ArrayList<>();
    }
    public void addChildren(FamilyMember f){
        children.add(f);
    }
    public int countLeaf() {
        int counter = 0;
        if(this.children.size() == 0)
            return 1;
        else{
            for(FamilyMember f : children)
                counter += f.countLeaf();
        }
        return counter;
    }
}
```



… and that’s it.

In future

Use the skills to make something awesome or learn something new!

- Learn C, C++, Javascript, C#, Something else
- Write a web application
- Write android applications
- Learn the new features in java 11
- … possibilities are endless, use the time you have now!

Teaching Team

Thanks to the teaching team of this semester!

- Andrew Esteban (TA)
- Madeleine Wagner
- Nejc Moskon
- Nikola Grujic
- Samuel Lin
- Sudeshna Sengupta
- Adam Ghanem
- Daniel Friedrich
- Finnegan Waugh
- Samarth Sehgal
- Zhiye Hong
- Ben Gane
- Sheikh Mohammad Mostakim Fattah

Unit of study survey

You have access to the unit of study survey

https://student-surveys.sydney.edu.au/students/

Please respond to this survey as we are interested in what we can improve with this unit.

I wish you all success in your life!

Thank you