Conceptual Modeling

# Before Class

1. What is UML. What diagrams can be created by using UML? Watch the video:

is a standardized modeling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems.

* 1. What's UML and Why Do You Need It? <https://youtu.be/8CBnAmYnwk0>
  2. UML model: <https://youtu.be/OmbZpJrlrbk>

Może być statyczny albo dynamiczny (do opisywania relacji pomiędzy obiektami)

1. Familiarize yourself with class diagrams. When do we use class diagrams?

The class diagram depicts a static view of an application. It represents the types of objects residing in the system and the relationships between them. A class consists of its objects, and also it may inherit from other classes. A class diagram is used to visualize, describe, document various different aspects of the system, and also construct executable software code.

It shows the attributes, classes, functions, and relationships to give an overview of the software system. It constitutes class names, attributes, and functions in a separate compartment that helps in software development. Since it is a collection of classes, interfaces, associations, collaborations, and constraints, it is termed as a structural diagram.

Purpose of Class Diagrams

The main purpose of class diagrams is to build a static view of an application. It is the only diagram that is widely used for construction, and it can be mapped with object-oriented languages. It is one of the most popular UML diagrams. Following are the purpose of class diagrams given below:  
- It analyses and designs a static view of an application.  
- It describes the major responsibilities of a system.  
- It is a base for component and deployment diagrams.  
- It incorporates forward and reverse engineering.

1. Watch the video:

Creating UML Class Diagrams and Objects Diagrams with Draw.io: <https://youtu.be/dcsvl3YqAEk>

1. Using the draw.io application (<https://draw.io>), try to create a class diagram for any class of objects. [Diagram](https://viewer.diagrams.net/?tags=%7B%7D&highlight=0000ff&edit=_blank&layers=1&nav=1&title=Zadanie%205%20Before%20class.png#R7Zhtb9owEMc%2FDVL3YlMeeOpLCF23lUrdmLTXbmKIV8dHbYeHfvqdE4cQAiVMo9skJCTi%2F50d%2B%2B7n40TLD5LVrSTz%2BB4iylueE61a%2Fqjlea7f9%2FDLKOtc6XXbuTCTLLJOpTBhL9SKjlVTFlFVcdQAXLN5VQxBCBrqikakhGXVbQq8%2BtY5mdGaMAkJr6s%2FWKTjXO17vVL%2FRNksLt7sdq9zS0IKZ3sSFZMIlluSf9PyAwmg86dkFVBuglfEJZ%2F38YB1szFJhW4y4W79Jfp513u%2B%2FqqlWvBFdJ2O3ttVFoSn9sATnUZmxXzPel0EQi1ZwonA0XAKQk%2BsxcUx4Wwm8DnEeVSisKBSM4zhwBo0zFENY8ajMVlDavarNAmfitEwBslecFnC7Zpoltri4HUrHhMzE2UHVUkV%2BjwUQXB3pHuyqjiOidJWCIFzMlfscXOMhMgZE0PQGhLrlJ0034RrNlGPeRFAPDFdbUk2B7cUEqrlGl2stW1xWFeHyxKutmO1eAssz%2B9bqC3Qs83KZc7xwab9BAS8PQhIJmaoCZLQ7NTdlue7JiAbk0plZi1NzEDjZNdp7wwmIhOhbdsj3mRKhDGqQajZgm5ivEUeBlZnREh4ogFwQMRGAnIUGec7UkEjp1N9kEU1JyFua5z5jNql8s2G3EiAc6c8u7Mxi%2FBWGI5AE01yaMwR5oDnzlLSGeIHMxc4HzqtDm48wLFbjvFj3KUOQOBZCMsQokjkkhoqG8D26hU%2BTqBFzsS%2FCXKu2z4Tcn4NuVrSOcuSmSe9qLzub2U8wdxxWqb4uyHAxG0XA7%2BOgb8n5Zw8Uv4AimkGZn2Z%2B%2B6gcCzbVZyZiKlkb0mB27TynKvutA%2F99FzV649TrztBVlLyivNuq6Yoqj%2BbSnNVLTzvzKsAN1R6LjHgdCBuViS52lOlyndyqhQIs0IEqeHANCskopdKdXZG%2B80YvXbOBGnncH%2FkuJce6W16JL%2FbtElqn4uD7pEmCXtvo%2BLru8%2Bp6eiHg4RyRsrxsT6qtsCYqUOzy1armGa%2BX%2Bm66quby%2BX5h16wpzErltAyvXRpp9e%2BTuM78M90ab1Ll%2Fanu7STKfjrXVr%2F%2F%2B%2FSLsXqDTBt2qh5J3OKw%2FJPssy29Vejf%2FML)

# During Class

1. Watch the video:

UML Class Diagram Tutorial: <https://youtu.be/UI6lqHOVHic>

1. Answer the questions:
   1. What are the three sections of a single class diagram.
   2. How access modifiers are marked in a class diagram.  
      - private  
      + public  
      # protected  
      ~package/default  
      + nazwa: string
   3. How static fields and static methods are tagged in a class diagram.
2. Working in a group, create a class diagram for:
   1. Computer file
   2. Bank account
   3. Any object
3. Based on the created class diagrams, define all classes.
4. Write a program that performs the following actions for the bank account:
   1. Deposit PLN 500
   2. Display balance
   3. Deposit PLN 200
   4. Display balance
   5. Withdraw PLN 300
   6. Display balance
5. If your account balance is less than the withdrawal amount, no withdrawal is possible. Include this condition in the program. When you try to withdraw, display a message.
6. In line with the bank's policy, you can withdraw no more than PLN 500 from your account at one time. Include these limitation in your program. Display a message when trying to withdraw a larger amount.

# After Class

1. Write programs for the other two classes defined in the “During Class” section.
2. The Best Books publishing house releases crime, drama, fantasy, and science fiction books. Consider what attributes can be used to describe the books. Then create a class diagram containing books attributes. Finally, define the class based on the created class diagram.
3. Competitors are judged by five judges during the competition. Each judge can score 1, 2, 3, 4 or 5 points. Then, the highest score and the lowest score are thrown out. The arithmetic mean of the remaining three scores is calculated and this is the competitor's final result that is displayed. Create a class diagram for the competition scoring system. Define the class and write a program that calculates the final result for three players.
4. Create a class diagram for a shopping list. You can use, for example, an ArrayList as the data structure for storing products. Then, based on the class diagram, define the class. Finally, create an object representing a shopping list and perform the following actions:
   1. Display the list of products (should be empty)
   2. Display information about the number of products to be purchased
   3. Add three products to your shopping list
   4. Display the list of products
   5. Display information about the number of products to be purchased
   6. Add one product to your shopping list
   7. Display the list of products
   8. Display information about the number of products to be purchased
5. Add to the list of products the ability to enter product names from the keyboard.
6. The sales system consists of three categories of objects: a seller, a customer and a purchased product. The seller can be a company while the customer is a person. Create class diagrams for each of the object categories. Then, based on the created class diagrams, define corresponding classes. Save all three diagrams in one file. Finally, define classes based on the created class diagrams and write a program that creates objects, assign them attribute values, and call the defined methods.
7. For any object of your choice, create a class diagram. When creating a diagram, take into account the principles of encapsulation. Then, based on the diagram you have created, define a class. Using a defined class, write a program that creates two objects, assign them attribute values, and call the defined methods.