Usman Institute of Technology

Department of Computer Science Fall 2022

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Course: Software Design and Architecture (SE-308)

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Date: 3-Nov-2022

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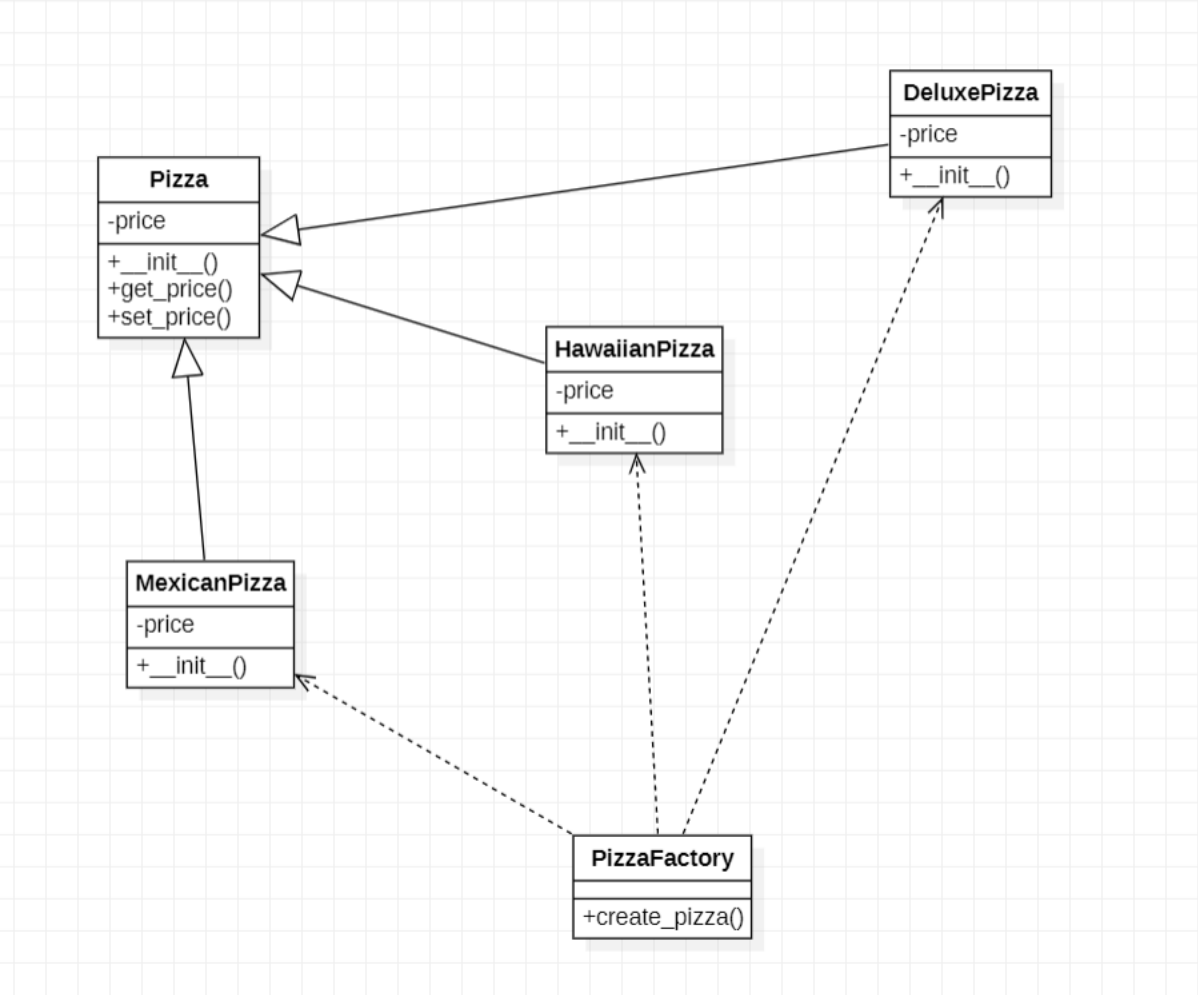
SDA Lab #06
Sir Misbah ud Deen

Lab Tasks:

Factory Design Pattern:



Code:

```
class Pizza(object):
    def __init__(self):
        self._price = None

    def get_price(self): return self._price


class MexicanPizza(Pizza):
    def __init__(self):
        self._price = 8.5
```

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```
class DeluxePizza(Pizza):
    def __init__(self):
        self._price = 10.5


class HawaiianPizza(Pizza):
    def __init__(self):
        self._price = 11.5


class PizzaFactory(object):
    @staticmethod
    def create_pizza(pizza_type):
        if pizza_type == 'Mexican':
            return MexicanPizza()
        elif pizza_type == 'Deluxe':
            return DeluxePizza()
        elif pizza_type == 'Hawaiian':
            return HawaiianPizza()


if __name__ == '__main__':
    for pizza_type in ('Mexican', 'Deluxe', 'Hawaiian'):
        print('Price of {0} pizza is {1}'.format(pizza_type,
              PizzaFactory.create_pizza(pizza_type).get_price()))
```

Output:

```
Price of Mexican pizza is 8.5
Price of Deluxe pizza is 10.5
Price of Hawaiian pizza is 11.5
```

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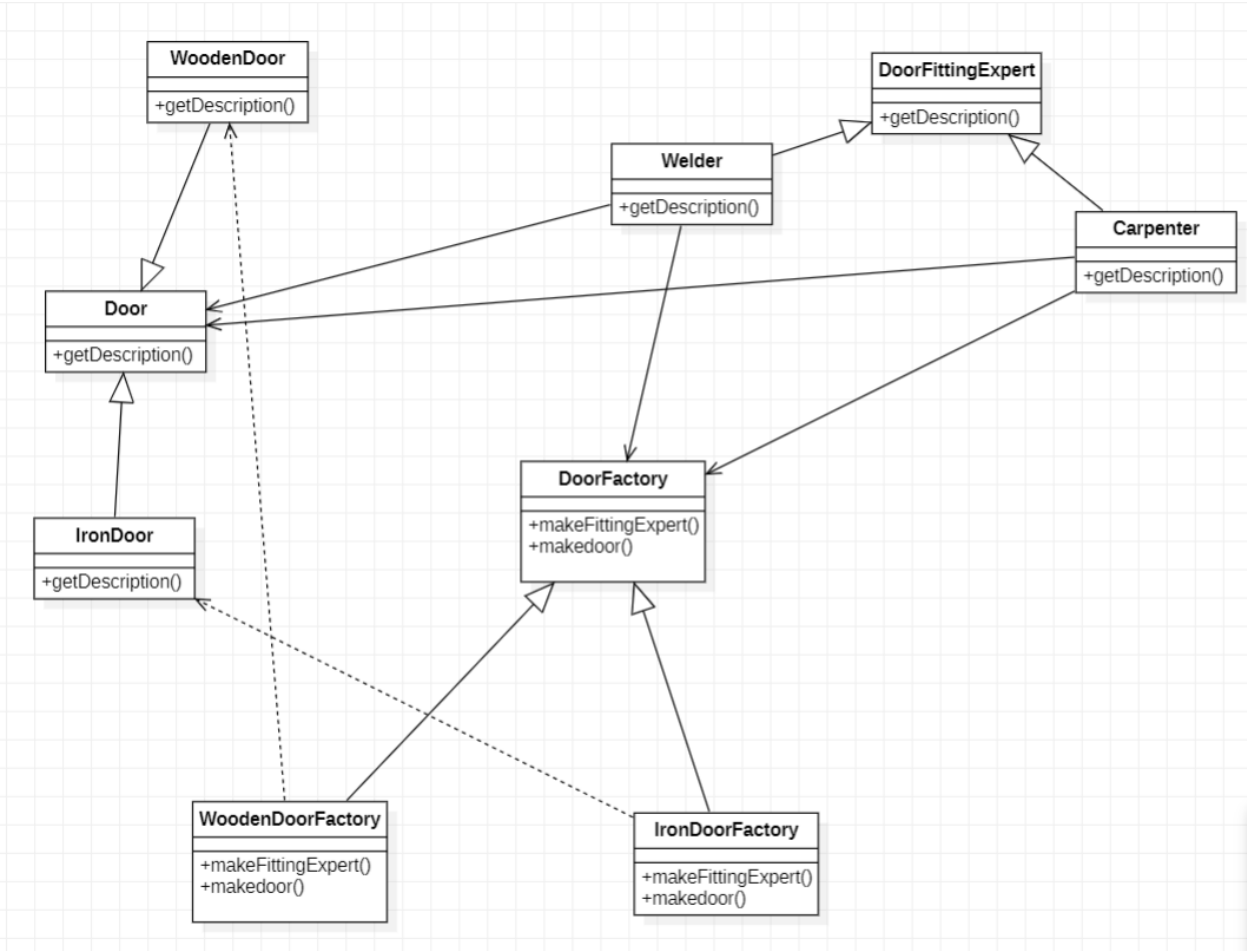
Abstract Factory Design Pattern:



Code:

```
class Door:
    def getDescription(self):
        pass


class WoodenDoor(Door):
    def getDescription(self):
        print('I am a wooden door')


class IronDoor(Door):
    def getDescription(self):
        print('I am an iron door')
```

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```
class DoorFittingExpert:
    def getDescription(self):
        pass


class Welder(DoorFittingExpert):
    def getDescription(self):
        print('I can only fit iron doors')


class Carpenter(DoorFittingExpert):
    def getDescription(self):
        print('I can only fit wooden doors')


class DoorFactory:
    def makeDoor(self):
        pass

    def makeFittingExpert(self):
        pass


class WoodenDoorFactory(DoorFactory):
    def makeDoor(self):
        return WoodenDoor()

    def makeFittingExpert(self):
        return Carpenter()


class IronDoorFactory(DoorFactory):
    def makeDoor(self):
        return IronDoor()

    def makeFittingExpert(self):
        return Welder()


if __name__ == '__main__':
    woodenFactory = WoodenDoorFactory()

    door = woodenFactory.makeDoor()
    expert = woodenFactory.makeFittingExpert()
```

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```
    door.getDescription()
    expert.getDescription()
    ironFactory = IronDoorFactory()

    door = ironFactory.makeDoor()
    expert = ironFactory.makeFittingExpert()
    door.getDescription()
    expert.getDescription()
```

Output:

```
I am a wooden door
I can only fit wooden doors
I am an iron door
I can only fit iron doors
```

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Home Task:

PC Specs (Factory Design Pattern):

```
class PC:
    def __init__(self) -> None:
        self._details = None

    def displayDetails(self):
        return self._details


class Asus(PC):
    def __init__(self):
        self._details = {
            "name": "asus",
            "specs": {
                "processor": "Ryzen 5",
                "ram": 8,
                "hdd": 500,
                "sdd": 256,
                "graphics": "asus 750ti"
            },
            "price": 580
        }


class HP(PC):
    def __init__(self):
        self._details = {
            "name": "hp",
            "specs": {
                "processor": "Core i5",
                "ram": 8,
                "hdd": 500,
                "sdd": 256,
                "graphics": "nvidia 1080ti"
            },
            "price": 680
        }


class Dell(PC):
    def __init__(self):
```

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```
        self._details = {
            "name": "dell",
            "specs": {
                "processor": "Core i7",
                "ram": 16,
                "hdd": 256,
                "sdd": 256,
                "graphics": "nvidia 3090ti"
            },
            "price": 920
        }


class PC_Factory(object):
    @staticmethod
    def pc_details(name):
        objs = {
            'asus': Asus(),
            'hp': HP(),
            'dell': Dell()
        }
        for key, value in objs.items():
            if key == name:
                return value


if __name__ == "__main__":
    for each in ['asus', 'hp', 'dell']:
        for key, value in PC_Factory.pc_details(each).displayDetails().items():
            print(key.upper(), ':', "".join(str(f"\n{key:^10} : {value}") for
key, value in value.items(
            )) if key == 'specs' else str(f" {value} "))
        print()
```

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Output:

```
NAME :  asus
SPECS :
processor  : Ryzen 5
   ram     : 8
   hdd     : 500
   sdd     : 256
 graphics  : asus 750ti
PRICE :  580

NAME :  hp
SPECS :
processor  : Core i5
   ram     : 8
   hdd     : 500
   sdd     : 256
 graphics  : nvidia 1080ti
PRICE :  680

NAME :  dell
SPECS :
processor  : Core i7
   ram     : 16
   hdd     : 256
   sdd     : 256
 graphics  : nvidia 3090ti
PRICE :  920
```