Chaitanya Ganpat Nalage
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Github Link: https://github.com/chaitanyanalage/CS5800

CS 5800.01 - Advanced Software Engineering

Quiz-2

Part 1

Code:

```
@startuml

class Character {
  - character: char
  - characterProperty: CharacterProperties
  + Character(character: char, characterProperty: CharacterProperties)
  + setCharacter(character: char): void
  + setCharacterProperty(characterProperty: CharacterProperties): void
  + getCharacter(): char
  + getFont(): String
  + getColor(): String
  + getSize(): int
}

class CharacterProperties {
  - font: String
  - color: String
  - size: int
  + CharacterProperties(font: String, color: String, size: int)
  + getFont(): String
  + getColor(): String
  + getSize(): int
}

class CharacterPropertiesFactory {
  - flyweights: Map<String, CharacterProperties>
  + setAndRetrieveFlyweightCharacterProperties(font: String, color: String,
size: int): CharacterProperties
  + sizeOfMap(): int
}

class Document {
  - characters: List<Character>
  - propertiesFactory: CharacterPropertiesFactory
  + addCharacter(c: char, font: String, color: String, size: int): void
  + editCharacterProperties(index: int, font: String, color: String, size:
int): void
  + saveToFile(filename: String): void
  + loadFromFile(filename: String): void
}

class Driver {
  + main(args: String[]): void
}

Character "1" *-- "1" CharacterProperties
Document "1" *-- "1" CharacterPropertiesFactory
```

```
Document "1" *-- "*" Character
Driver -- Document

@enduml
```

Output:

Part 2

Code:

```
@startuml
'https://plantuml.com/object-diagram
together {

    object "<u>index0: Character</u>" as Character0{
        character="H"
        characterProperty=
        Arial16Black
    }
    object "<u>index1: Character</u>" as Character1{
        character="e"
        characterProperty=
        Arial14Black
    }
    object "<u>index2: Character</u>" as Character2{
        character="l"
        characterProperty=
        Arial14Black
    }
    object "<u>index3: Character</u>" as Character3{
        character="l"
        characterProperty=
        Arial14Black
    }
    object "<u>index4: Character</u>" as Character4{
        character="o"
        characterProperty=
        Arial14Black
    }
    object "<u>index5: Character</u>" as Character5{
        character="W"
        characterProperty=
        Arial16Black
    }
    object "<u>index6: Character</u>" as Character6{
        character="o"
        characterProperty=
        Arial14Black
    }
    object "<u>index7: Character</u>" as Character7{
        character="r"
        characterProperty=
        Arial14Black
    }
    object "<u>index8: Character</u>" as Character8{
        character="l"
        characterProperty=
        Arial14Black
    }
    object "<u>index9: Character</u>" as Character9{
```

```
                character="d"
                characterProperty=
                Arial14Black
        }
        object "<u>index10: Character</u>" as Character10{
                character="C"
                characterProperty=
                Verdana18Blue
        }
        object "<u>index11: Character</u>" as Character11{
                character="S"
                characterProperty=
                Verdana18Blue
        }
        object "<u>index12: Character</u>" as Character12{
                character="5"
                characterProperty=
                Verdana12Red
        }
        object "<u>index13: Character</u>" as Character13{
                character="8"
                characterProperty=
                Verdana12Red
        }
        object "<u>index14: Character</u>" as Character14{
                character="0"
                characterProperty=
                Verdana12Red
        }
        object "<u>index15: Character</u>" as Character15{
                character="0"
                characterProperty=
                Verdana12Red
        }
}
object "<u>Arial16Black: CharacterProperties</u>" as Arial16Black{
        font="Arial"
        color="Black"
        size=16
}
object "<u>Arial14Black: CharacterProperties</u>" as Arial14Black{
        font="Arial"
        color="Black"
        size=14
}
object "<u>Verdana18Blue: CharacterProperties</u>" as Verdana18Blue{
        font="Verdana"
        color="Blue"
        size=18
}
object "<u>Verdana12Red: CharacterProperties</u>" as Verdana12Red{
        font="Verdana"
        color="Red"
        size=12
}
```

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```
Character0 o--[#purple] Arial16Black
Character1 o--[#green] Arial14Black
Character2 o--[#green] Arial14Black
Character3 o--[#green] Arial14Black
Character4 o--[#green] Arial14Black
Character5 o--[#purple] Arial16Black
Character6 o--[#green] Arial14Black
Character7 o--[#green] Arial14Black
Character8 o--[#green] Arial14Black
Character9 o--[#green] Arial14Black
Character10 o--[#blue] Verdana18Blue
Character11 o--[#blue] Verdana18Blue
Character12 o--[#red] Verdana12Red
Character13 o--[#red] Verdana12Red
Character14 o--[#red] Verdana12Red
Character15 o--[#red] Verdana12Red

object "<u>testDocument: Document</u>" as Document{
  List<Character> characters=
  [('H', "Arial","Black", 16),
  ('e', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('o', "Arial","Black", 14),
  ('W', "Arial","Black", 16),
  ('o', "Arial","Black", 14),
  ('r', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('d', "Arial","Black", 14),
  ('C', "Verdana","Blue",18),
  ('S', "Verdana","Blue",18),
  ('5', "Verdana","Red", 12),
  ('8', "Verdana","Red", 12),
  ('0', "Verdana","Red", 12),
  ('0', "Verdana","Red", 12)]

  CharacterPropertiesFactory propertiesFactory
}
object "<u>propertiesFactory: CharacterPropertiesFactory</u>" as
flyweightFactory{
    Map<String,CharacterProperties> flyweights=
    {"Arial16Black":Arial16Black,
     "Arial14Black":Arial14Black,
     "Verdana18Blue":Verdana18Blue,
     "Verdana12Red";Verdana12Red}
}

Document *--flyweightFactory

flyweightFactory *--Arial16Black
flyweightFactory *--Arial14Black
flyweightFactory *--Verdana18Blue
flyweightFactory *--Verdana12Red

Document *-- Character0
```
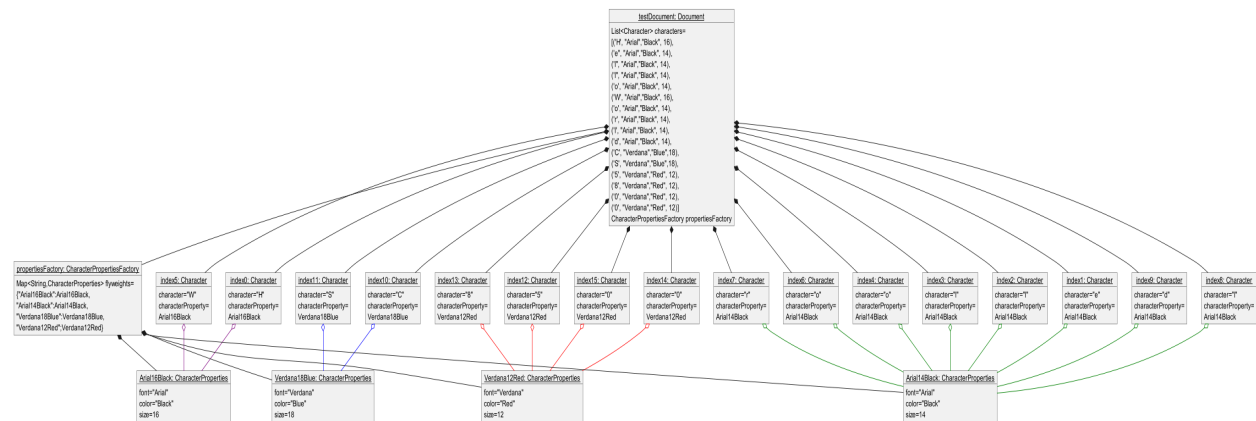
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```
Document *-- Character1
Document *-- Character2
Document *-- Character3
Document *-- Character4
Document *-- Character5
Document *-- Character6
Document *-- Character7
Document *-- Character8
Document *-- Character9
Document *-- Character10
Document *-- Character11
Document *-- Character12
Document *-- Character13
Document *-- Character14
Document *-- Character15

@enduml
```

Part 3

Code:

```
@startuml
'https://plantuml.com/object-diagram
together{
    object "<u>index0: Character</u>" as Character0{
        character="H"
        characterProperty=
        Calibri99Blue
    }
    object "<u>index1: Character</u>" as Character1{
        character="e"
        characterProperty=
        Arial14Black
    }
    object "<u>index2: Character</u>" as Character2{
        character="l"
        characterProperty=
        Arial14Black
    }
    object "<u>index3: Character</u>" as Character3{
        character="l"
        characterProperty=
        Arial14Black
    }
    object "<u>index4: Character</u>" as Character4{
        character="o"
        characterProperty=
        Arial14Black
    }
    object "<u>index5: Character</u>" as Character5{
        character="W"
        characterProperty=
        Calibri99Blue
    }
    object "<u>index6: Character</u>" as Character6{
        character="o"
        characterProperty=
        Arial14Black
    }
    object "<u>index7: Character</u>" as Character7{
        character="r"
        characterProperty=
        Arial14Black
    }
    object "<u>index8: Character</u>" as Character8{
        character="l"
        characterProperty=
        Arial14Black
```

```
        }
        object "<u>index9: Character</u>" as Character9{
            character="d"
            characterProperty=
            Arial14Black
        }
        object "<u>index10: Character</u>" as Character10{
            character="C"
            characterProperty=
            Verdana18Blue
        }
        object "<u>index11: Character</u>" as Character11{
            character="S"
            characterProperty=
            Verdana18Blue
        }
        object "<u>index12: Character</u>" as Character12{
            character="5"
            characterProperty=
            Verdana12Red
        }
        object "<u>index13: Character</u>" as Character13{
            character="8"
            characterProperty=
            Verdana12Red
        }
        object "<u>index14: Character</u>" as Character14{
            character="0"
            characterProperty=
            Verdana12Red
        }
        object "<u>index15: Character</u>" as Character15{
            character="0"
            characterProperty=
            Verdana12Red
        }
}

object "<u>Arial16Black: CharacterProperties</u>" as Arial16Black{
    font="Arial"
    color="Black"
    size=16
}
object "<u>Arial14Black: CharacterProperties</u>" as Arial14Black{
    font="Arial"
    color="Black"
    size=14
}
object "<u>Verdana18Blue: CharacterProperties</u>" as Verdana18Blue{
    font="Verdana"
    color="Blue"
    size=18
}
object "<u>Verdana12Red: CharacterProperties</u>" as Verdana12Red{
    font="Verdana"
    color="Red"
```

```
        size=12
}
object "<u>Calibri99Blue: CharacterProperties</u>" as Calibri99Blue{
    font="Calibri"
    color="Blue"
    size=99
}


Character0 o--[#purple] Calibri99Blue
Character1 o--[#green] Arial14Black
Character2 o--[#green] Arial14Black
Character3 o--[#green] Arial14Black
Character4 o--[#green] Arial14Black
Character5 o--[#purple] Calibri99Blue
Character6 o--[#green] Arial14Black
Character7 o--[#green] Arial14Black
Character8 o--[#green] Arial14Black
Character9 o--[#green] Arial14Black
Character10 o--[#blue] Verdana18Blue
Character11 o--[#blue] Verdana18Blue
Character12 o--[#red] Verdana12Red
Character13 o--[#red] Verdana12Red
Character14 o--[#red] Verdana12Red
Character15 o--[#red] Verdana12Red

object "<u>testDocument: Document</u>" as Document{
  List<Character> characters=
  [('H', "Calibri","Blue", 99),
  ('e', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('o', "Arial","Black", 14),
  ('W', "Calibri","Blue", 99),
  ('o', "Arial","Black", 14),
  ('r', "Arial","Black", 14),
  ('l', "Arial","Black", 14),
  ('d', "Arial","Black", 14),
  ('C', "Verdana","Blue",18),
  ('S', "Verdana","Blue",18),
  ('5', "Verdana","Red", 12),
  ('8', "Verdana","Red", 12),
  ('0', "Verdana","Red", 12),
  ('0', "Verdana","Red", 12)]

  CharacterPropertiesFactory propertiesFactory
}
object "<u>propertiesFactory: CharacterPropertiesFactory</u>" as
flyweightFactory{
    Map<String,CharacterProperties> flyweights=
    {"Arial16Black":Arial16Black,
     "Arial14Black":Arial14Black,
     "Verdana18Blue":Verdana18Blue,
     "Verdana12Red";Verdana12Red
     "Calibri99Blue":Calibri99Blue}
}
```

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```
Document *--flyweightFactory

flyweightFactory *--Arial16Black
flyweightFactory *--Arial14Black
flyweightFactory *--Verdana18Blue
flyweightFactory *--Verdana12Red
flyweightFactory *--Calibri99Blue


Document *-- Character0
Document *-- Character1
Document *-- Character2
Document *-- Character3
Document *-- Character4
Document *-- Character5
Document *-- Character6
Document *-- Character7
Document *-- Character8
Document *-- Character9
Document *-- Character10
Document *-- Character11
Document *-- Character12
Document *-- Character13
Document *-- Character14
Document *-- Character15

@enduml
```

Output: