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Class: CS_162_400_Su2016
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Objective: You will design and implement a text-based game or puzzle where the player moves through a series of rooms or compartments. Each space will be a class with (at least) four pointer variables that link to other spaces. You must have at least 5 spaces of at least 3 different types. You will have a space abstract class that will have a special pure virtual function. Each type of space will have a special action. You will have at least 3 derived classes for different types of spaces. You will have at least 3 derived classes for different types of spaces.

You must have some way to keep track of which space the player is in. The player will have a container (backpack, knitting bag, or notebook) to carry "items". The container must have some limit. One or more of these items will be required as part of the solution, such as a "key" to open the locked door. You should have a time limit to urge the player on. This does not mean a literal clock, just some way to prevent the 'game' from going on indefinitely. The player must interact with parts of the structure, and not just simply collect things.This can be throwing something at the monster, operating a light switch (or other control), opening doors, or singing to get the baby back to sleep.

Theme: Game of Life – Make it through with enough money for retirement. You will start off with a certain amount of funds before the game begins. Player will traverse through the different spaces (school, apartment, work, new house, lawyer's office, retirement community) in order to perform the necessary tasks before going to the retirement community. Player must have a minimum amount of money in order to get into the retirement community. Tasks player must perform:

- Get a degree from school
- Obtain a house (not an apartment)
- Get married
- Get one bonus at work
- Obtain enough money to retire (set amount of money)

List of Rooms and games within rooms:

1. <u>School:</u>
    a. Answer random trivia questions to get your degree
    b. if you win you get your degree and have $500 worth of student loans
    c. if you lose, you must try again for your degree and will be charged another $500.
2. <u>Apartment:</u>
    a. Roll dice for your house type (trailer, rancher, mansion, etc.)
    b. Options range in price
    c. Once you get a house, your apartment will be deleted and your house space will be created.
3. <u>Work:</u>
    a. Combat game against boss
        i. Lose = must take a vacation to de-stress (losing money)
        ii. Win = get bonus! (gain money)
        iii. Job: random chance that when you go into the work space that you will receive your salary's pay.

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4. <u>New House:</u>
    a. Have option of cooking dinner or reading the newspaper
    b. Reading newspaper will allow you to donate plasma in order to get more money.
    c. Cooking will give you a random chance to lose or make money
5. <u>Lawyer's Office:</u>
    a. Must go here in order to get married
    b. Have the option of fighting to erase your student loans.
6. <u>Retirement Community:</u>
    a. If you have enough money, and meet all the requirements, game over – you win!
    b. If you do not meet the requirements, you will be rejected from entering and must go back to work in order to get more money before the time runs out.

Breaking Down the Code:

Data Needed	Actions
Person Class - Money (double) - StudentLoans (double) - House - Bonus - Marriage - Degree - Item container	Person - getStudentLoans - getMoney - get/set Bonus - get/set degree - get/set marriage - add to container - get container
Space (abstract class) - Person object - Name of room - Next pointer - Back pointer - up pointer (ptr1) - down pointer (ptr2)	Space (abstract class) - Menu - Validate move/links - getName of room
List - head pointer - tail pointer - Person pointer	List - addSpace - removeSpace - setPerson - setLocation - getLocation - move person
School - Degree (will be a bool based on game results) - Physical degree	School - Increase Student Loans (if trying to earn degree) - Pay Student Loans - Get physical degree - Get intellectual degree
Apartment	Apartment

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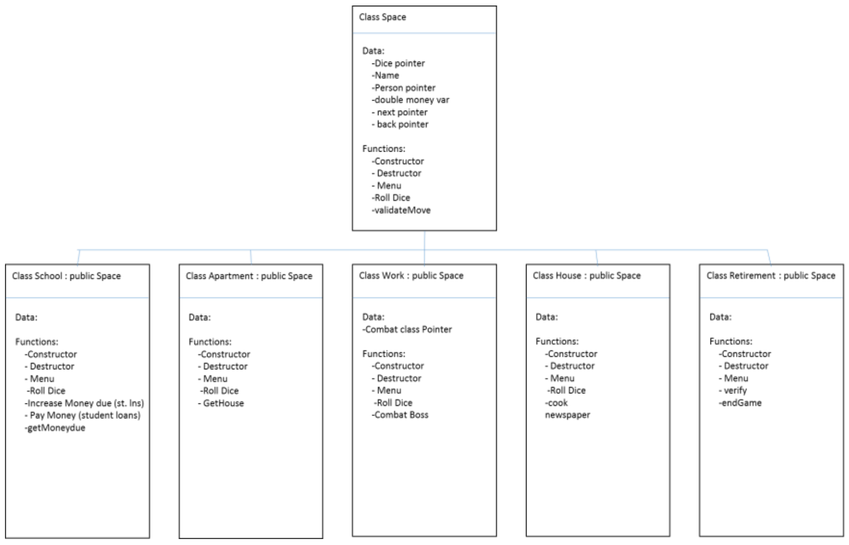
- Dice Class - House price (array of ints)	- Increase house debt - Get house debt - Roll Dice
Work - Combat class - Dice class - Salary (double)	Work - Combat - Roll Dice - getSalary - Increase Salary (promotion)
New House - Dice class - Interactive Item	Home - Roll Dice - Newspaper - Cooking
Retirement Community - Person pointer - Game over flag	Retirement Community - Verify requirements - End game
Lawyer office - Creature 1 - Creature 2 - Marriage bool	Lawyer Office - Get married - Fight for no student loans -
Main game class - Timer for game - List object - Person object - Space object	Main game class - Main menu - Room menu - Requirements list

Space Class Hierarchy:



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Design/Implementation 1: Creating a linked structure with 4 pointers per class, and moving through each structure.

Pseudocode:

Space.hpp file:

```
Class Space {
    Protected:
        String Name
        Space *next
        Space *back
        Space *ptr1
        Space *ptr2
        Friend class List
    Public:
        Constructor()
        Destructor()
        Virtual String getName()
        Virtual bool validMove(Space *)
        Virtual void menu()
}
```

Space.cpp file:

```
Constructor
    SET Name = space
    SET 2 ptr Pointers = NULL
    SET next and back = NULL

Destructor {}

String getName()
    RETURN name

Bool validMove(Space *s)
    CREATE bool vMove
        SET vMove = false

    IF (this->getName() = s's getName())
```

```
                DISPLAY "Re-entering current room"
                SET
            ELSE IF (this->ptr1 = s OR this->ptr2 = s)
                DISPLAY "You are now going to s's getname()"
                SET vMove = true
            ELSE IF (this->next = s OR this->back = s)
                DISPLAY "you are not going to s's getname()"
                SET vMove = true
            ELSE
                DISPLAY "this move is illegal"
                SET vMove = false
            RETURN vMove

        Void Menu() {}
```

List.hpp file:

```
        Class List {
            Private:
                Space *head
                Int listLength
            Public:
                Constructor
                Destructor
                Void addSpace( Space *, int)
                Void removeSpace(int)
                Void getNodeNames()
        }
```

List.cpp file:

```
        Constructor
            SET head = NULL
            SET listLength = 0
            CREATE Game Layout

        Destructor
            CREATE Space *prev
                SET prev = head
```

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```
                CREATE Space *ptr
                    SET ptr = head

                WHILE (ptr != NULL)
                    SET prev = ptr
                    SET ptr = ptr's next pointer
                    DELETE prev

            Void addSpace (Space *newSpace, int position)
                CREATE Space *ptr
                    SET ptr = head
                CREATE Space *prev
                    SET prev = head
                CREATE int count
                    SET count = 0

                IF (head is NULL)
                    SET head = newSpace
                    Set head's next pointer = NULL
                ELSE
                    WHILE (ptr is not NULL)
                        IF (position equals count)
                            SET prev's next pointer = newSpace
                            SET newSpace's next to ptr
                            INCREMENT listLength
                        SET prev = ptr
                        SET ptr = ptr's next
                        INCREMENT count
                IF (position equals count)
                    SET prev's next pointer = newSpace
                    SET newSpace's next to ptr
                    INCREMENT listLength

            Void removeSpace(int position)
                ……

            Void getNodeNames()
```

```
CREATE Space *temp
    SET temp = head
WHILE (temp is not NULL)
    DISPLAY temp's getName()
    SET temp = temp's next
```

All derived classes in phase 1 will follow the following design:

School.hpp file:

```
Class School : Public Space {
    Public:
        Constructor
        Destructor
        getName()
}
```

School.cpp file:

```
Constructor()
    SET Name = School

Destructor()
    IF school
        DELETE school

String getName()
    RETURN name
```

Design/Implementation 1 Test Plan:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

Space pointer to School class calls School's getName funct	Space *sp2 = new School;
	Sp2->getName()
		Main()
		getName()
			"School"	"School"

List Class addSpace function adds	L->addSpace(sp, 0);
	L->getNodeNames();
		Main()
		addSpace()
			"space"	"space"

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node to beginning of list				

List Class addSpace function adds node to second spot of list	L->addSpace(sp, 0);
	L->getNodeNames();
		Main()
		addSpace()
			“space”
			“School”
				“space”
				“School”

Design/Implementation 2: Going from Singly linked to Doubly linked

List.cpp file was updated with blue highlighted statements as follows:

```
List Constructor()
    SET head = NULL
    SET tail = NULL
    SET listlength = NULL

List addSpace()
    CREATE Space *ptr
        SET ptr = head
    CREATE Space *prev
        SET prev = head
    CREATE int count
        SET count = 0

    IF (head is NULL)
        SET head = newSpace
        SET head’s next pointer = NULL
        SET head’s back pointer = NULL
    ELSE
        WHILE (ptr is not NULL)
            IF (position equals count)
                SET prev’s next pointer = newSpace
                SET newSpace’s next to ptr
                SET newSpace’s back to prev
                INCREMENT listLength
            SET prev = ptr
            SET ptr = ptr’s next
            INCREMENT count
```

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```
IF (position equals count)
        SET prev's next pointer = newSpace
        SET newSpace's next to ptr
        SET newSpace's back to prev
        INCREMENT listLength

List getNodeNames()
        *NOTE: new while loop only incremented for testing purposes. Will be
        commented or deleted out in finalized code.

        CREATE Space *temp
                SET temp = head
        CREATE Space *bckwrds
                SET bckwrds = head
        WHILE (temp is not NULL)
                DISPLAY temp's getName()
                SET temp = temp's next

        DISPLAY "traverse backwards"
        SET temp = bcwrds
        WHILE (temp is not NULL)
                DISPLAY temp's getName()
                SET bckwrds = temp
                SET temp = temp's back
```

Design/Implementation 2: Test Plan

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

Space object back pointers able to traverse backwards to previous node	L->getNodeNames()	Main()
		GetNodeNames()
			"space"
			"School"
			"Apartment"
			"Work"
			"Retirement"
			"Traverse backwards: "
			"Retirement"
			"Work"
			"Apartment"
			"School"
			"space"
				"space"
				"School"
				"Apartment"
				"Work"
				"Retirement"
				"Traverse backwards: "
				"Retirement"
				"Work"
				"Apartment"
				"School"
				"space"

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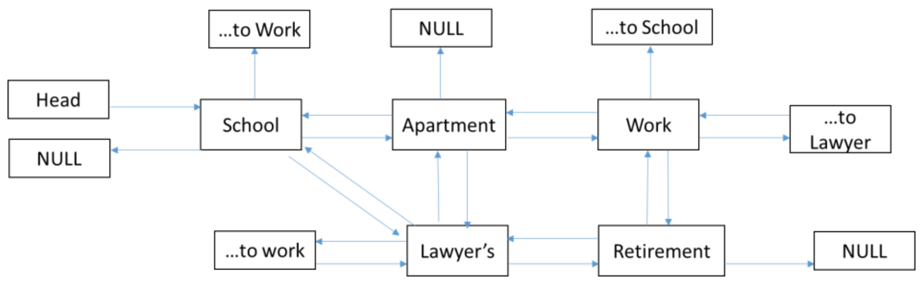
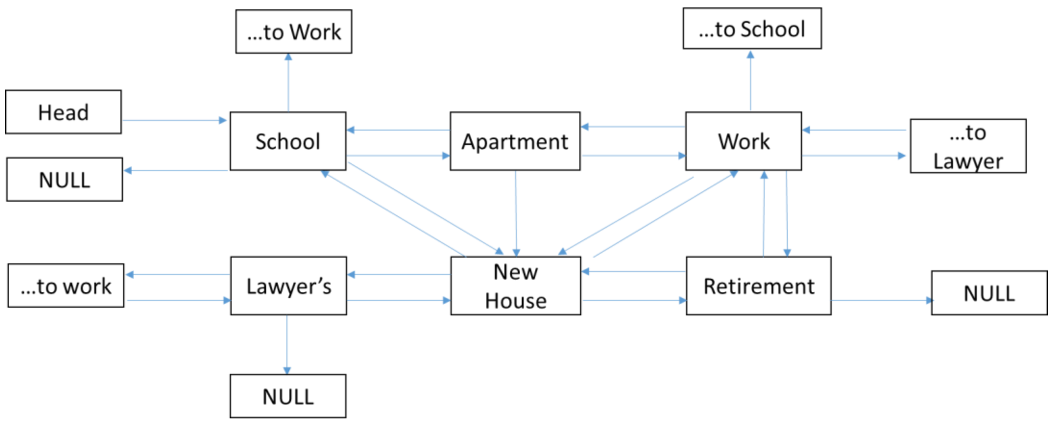
Design/Implementation 3: Interconnecting Remaining Pointers

Connections:

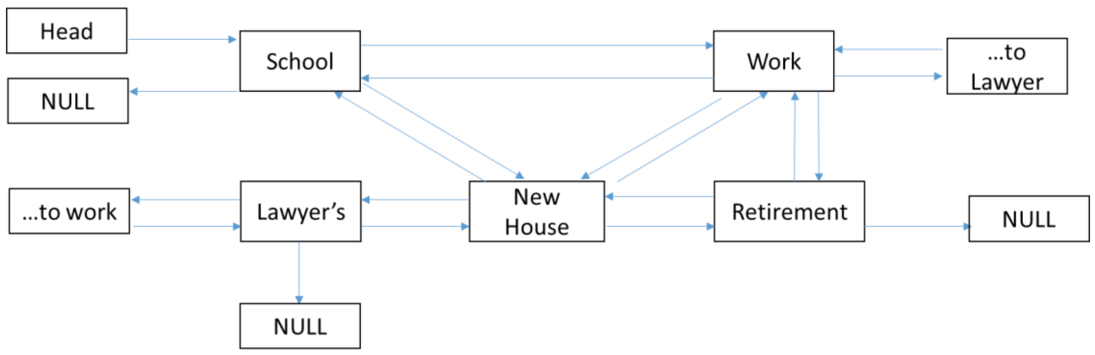
(*Before Apartment is deleted):*



While house is being added:



After Apartment is deleted:



Pseudocode:

Added in createGame() function to List class:

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```
        List.cpp file:
            Constructor()
                SET head = NULL
                SET tail = NULL
                SET listlength = NULL
                SET player = NULL

            Void List::createGame() {
                CREATE Space *sp
                SET sp to each space type
                CALL addSpace function for each space type
                    (This creates a doubly linked list)
                CREATE Space *temp
                    SET temp = head

                //Assigning school pntrs to work and lawyer
                SET head's ptr1 = head next, next
                SET head's ptr2 = head next, next, next

                SET temp = temp's next

                //Assigning Apartment to lawyer
                SET temp's ptr1 = head's next, next, next

                SET temp = temp's next

                //Assigning Work to school and retirement
                SET temp's ptr1 = head
                SET temp's ptr2 = temp's next, next

                SET temp = temp's next

                //Assigning Lawyer to apartment and school
                SET temp's ptr1 = head's next
                SET temp's ptr2 = head

                SET temp = temp's next
                //Assigning retirement to work
                SET temp's ptr1 = temp's back, back
        }
```

Test Plan:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome
Go from school to work node	3	L->move School->validMove()	"You are now going to work"	"You are now going to work"
Go from school to Retirement	5	L->move School->validMove()	"illegal move"	"illegal move"

Design/Implementation 4: Creating Person Class and Moving Through Structure

Person.hpp file:

```
Class Person {
    Private:
        String pName
        Double money
        Double studentLoans
        Int kidsNum
        String container[2]
        Bool house
        Bool degree
        Bool physDeg
        Bool bonus
        Bool end
    Public:
        Constructor(string)
        Constructor()
        Destructor()
        String getName()
        Double getStudentLoans()
        Void addStudentLoans(double)
        Double getMoney()
        Void addMoney(double)
```

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```
                                        Bool getHouse()
                                        Void setHouse(bool)
                                        Bool getDegree()
                                        Void setDegree(bool)
                                        Bool getPhysDeg()
                                        Void setPhysDeg(bool)
                                        Void addContainer(string &)
                                        String * getContainer()
                                        Void setBonus(bool)
                                        Bool getBonus()
                                        Void setEnd(bool)
                                        Bool getEnd()
```

Person.cpp file:

```
Constructor (string nameIn)
        SET pName = nameIn
        SET money = 100
        SET studenLoans = 0
        SET kidsNum = 0
        SET loc = NULL
        SET house = false
        SET degree = false
        SET physDeg = false
        SET end = false

        FOR (int I = 0 to 1)
                SET container[i] = “0”


Constructor ()
        SET pName = “Player 2”
        SET money = 100
        SET studenLoans = 0
        SET kidsNum = 0
        SET loc = NULL
```

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```
        SET house = false
        SET degree = false
        SET physDeg = false
        SET end = false

        FOR (int I = 0 to 1)
            SET container[i] = “0”

    Destructor()

    Space * getName()
        RETURN name

    Double getMoney()
        RETURN money

    Void addMoney(double m)
        SET money = money + m

    Double getStudentLoans()
        RETURN studentLoans

    Void addStudentLoans(double s)
        SET studentLoans = studentLoans + s

    Void addContainer(string &s)
        FOR (int I = 0 to 1)
            IF (container[i] = “0”)
                SET container[i] = s


    NOTE: all remaining get/set functions will take the following form:
    Void setHouse (bool h)
        SET house = h
    Bool getHouse()
        RETURN houe
```

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List.cpp file was updated with blue highlighted statements as follows:

```
Void addSpace (Space *newSpace, int Position)
    CREATE Space *ptr
        SET ptr = head
    CREATE Space *prev
        SET prev = head
    CREATE int count
        SET count = 0

    IF (head is NULL)
        SET head = newSpace
        SET head's next pointer = NULL
        SET head's back pointer = NULL
        CALL player's setLoc()
            SEND head as parameter
NOTE: move() and setPlayer() are new functions
Void move (int input)
    CREATE Space *nwRm
        SET nwRm = head

    IF (input = 1)
        SET nwRm = head
    ELSE IF (input = 2)
        SET nwRm = head's next
    ELSE IF (input = 3)
        SET nwRm = head's next, next
    ELSE IF (input = 4)
        SET nwRm = nwRm's next
        SET nwRm = nwRm's next, next
    ELSE
        SET nwRm = nwRm's next, next
        SET nwRm = nwRm's next, next

    CREATE Space *temp
        SET temp = players location
```

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```
        CREATE bool vMove
            SET vMove =  temp's validMove()
                SEND it to nwRm

        IF (vMove)
            CALL player's location
                SEND nwRm

    Void removeSpace(int position)
        CREATE Space *ptr
            SET ptr = head
        CREATE Space *prev
            SET prev = head

        IF (head is NULL)
            DISPLAY "List empty"
        ELSE IF (position is 0)
            SET head = head's next
            SET ptr = head
            DELETE prev
            SET prev = ptr
            DECREMENT listLength
        ELSE
            WHILE (ptr)
                IF (position = count)
                    SET prev's next = ptr's next
                    DELETE ptr
                    SET ptr = prev's next
                    SET ptr's back = prev
                    DECREMENT listLength
                SET prev = ptr
                SET ptr = ptr's next
                INCREMENT count
        IF (position = listLength)
            SET prev's next = NULL
            DELETE ptr
            SET ptr = prev's next
```

```
                    SET tail = prev
                    DECREMENT listLength

          Void setPlayer (Person *pIn)
               SET player = pIn
```

Test Plan:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

Move player's location to same room	1 (School)	Main()
		Move()
		validMove()
		setLoc()
			"Original location: 0x7013c0" (for example)
			"New location: 0x7013c0"
				"Original location: 0x7013c0" (for example)
				"New location: 0x7013c0"

Move player's location to acceptable choice (link to space)	2 (Apartment)	Main()
		Move()
		validMove()
		setLoc()
			"Original location: 0x7013c0" (for example)
			"New location: 0xfc1400" (for example)
				"Original location: 0x7013c0" (for example)
				"New location: 0xfc1400" (for example)

Move player's location to unacceptable choice (no link to space)	5 (Retirement)	Main()
		Move()
		validMove()
		setLoc()
			"That move is not legal. Pick again. "	"That move is not legal. Pick again. "

Design/Implementation 5: Converting Space Class to Pure Virtual

- Set all functions equal to zero.
- Copied all functions (getName & validMove) to derived classes
- Added Menu function to Space class and all derived classes (empty placeholder function so far).

Test Plan: compiler run.

Design/Implementation 6: Creating the Work Class:

- Added in the combat class and two creature pointers, and double therapyMoney and double bonus
- Added in setPerson function, and Person pointer to Space abstract class
- Developed Menu function

Work.cpp file:

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```
        Bool combat()
            CREATE new BlueMenYou object with you pointer
            CREATE new MedusaBoss object with boss pointer
            CREATE double attackRoll for fight
            CREATE bool dead
            CREATE bool youDied
                SET equal to false
            CREATE double lifeStrength for fight

        DO {
            DISPLAY strength of each character by using character's getStrength()
            DISPLAY name of each character by using character's getName()
            CALL boss's attack function
            CALL your defense function
                SEND boss's attack value
            GET your strength after attacks

            CALL your dead function
                IF (dead)
                    DISPLAY "You lost. Pay $$ for therapy. "
                    SET youdied = true
                ELSE
                    CALL your attack function
                    CALL boss's defense function
                        SEND your attack value

                    IF (dead)
                        DISPLAY "Boss lost the fight. You get raise!"
                        SET youdied = false
        } WHILE (not dead)
        RETURN youdied

    Void setPerson(Person *pIn)
        SET player1 = pIn

    Void menu()
        CREATE bool payMoney
        DISPLAY story about boss wanting to fight
        DISPLAY "Hit enter to begin your fight"
        IGNORE leftover buffer newline
        GET next input
```

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```
SET payMoney = combat() call
IF (payMoney)
    CALL person's addMoney() function
        SEND therapyMoneuy
ELSE
    CALL person's addMoney() function
        SEND bonus
```

Test Plan 6:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

Work menu Displays when menu function is called	nwRm->menu()	List::move()
		Work::menu()
			"You are at work…."	"You are at work…."

Work combat function produces winner	None	Work::combat()	"Boss lost" or "Boss wins"	"Boss lost" or "Boss wins"

Person's money increases by X amount when player wins battle	none	Work::combat()
		Work::Menu()
		Person::addMoney()
			"Player's original money: 100 "
			"player's new money: 300"
				"Player's original money: 100 "
				"player's new money: 300"

Person's money decreases by X amount when player loses battle	none	Work::combat()
		Work::Menu()
		Person::addMoney()
			"Player's original money: 100 "
			"player's new money: -900"
				"Player's original money: 100 "
				"player's new money: -900"

Design/Implementation 7: Creating the Apartment Class:

- Developed Menu
- Added in rollHouseDie() which rolls a die to select a house type and cost for player to buy

Apartment.cpp file:

```
Int Menu()
    CREATE char house
    DISPLAY "you are in your apt would you like to look for a house?"
    SET house to input
    IF (house == yes)
        CALL rollHouseDice function
```

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```
            ELSE
                DISPLAY "please come back when you are ready to buy a house"

        Void rollHouseDie()
            CREATE string houseType
            CREATE double cost
            CREATE char buy
            CREATE bool bought
                SET = false
            CREATE new DiceMod from DiceMod pointer
            CALL die1's setSideCount ()
                Send 3 to function
            CREATE double result
            CREATE int result2

            SET result =  die1's rollDie()
            SET result2 = type-casted result

            DISPLAY "Press enter to see your house type"
            IGNORE input
            GET input

            SWITCH (result2)
                CASE 1:
                    DISPLAY "trailer. Cost = 800. Want to buy?"
                    SET buy = input
                    SET houseType = trailer
                    SET cost = -800
                    Break
                CASE 2:
                    DISPLAY "split level. Cost = 4000. Want to buy?"
                    SET buy = input
                    SET houseType = split level
                    SET cost = -4000
                    Break
                CASE 3:
                    DISPLAY "Mansion. Cost = 10,000. Want to buy?"
                    SET buy = input
                    SET houseType = mansion
                    SET cost = -10000
                    Break
            IF (buy = y or Y)
                DISPLAY “Congrats! You can’t go back to the apt but go to your house
                instead”
                SET bought = true
                CALL player’s addMoney()
                    SEND cost
                CALL player’s setHouse()
                    SEND bought
            ELSE
                DISPLAY “Visit apt again to roll for another house”
```

Test Plan 7:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

Apartment menu Displays when menu function is called	nwRm->menu()	List::move()
		Apartment::menu()
			“You are at your apartment….”	“You are at your apartment….”

Apartment rollHouseDie function randomly generates numbers	None	Apartment::rollHouseDie()	New house type appears each time	New house type appears each time

If person buys house, money removed from their account	‘Y’ or ‘y’	Apartment::rollHouseDie()
		Person::addMoney()
			“Player’s original money: 100 “
			“player’s new money: -XXX”
				“Player’s original money: 100 “
				“player’s new money: -XXX”

If person buys house, their house bool is changed	‘Y’ or ‘y’	Apartment::rollHouseDie()
		Person::addMoney()
			“Player’s house: 0 “
			“player’s house: 1”
				“Player’s house: 0 “
				“player’s house: 1”

If person does not buy house, their house bool is not changed	‘N’ or ‘n’	Apartment::rollHouseDie()
		Person::addMoney()
			“Player’s house: 0 “
			“player’s house: 0”
				“Player’s house: 0 “
				“player’s house: 0”

If person does not buy house, their money is not changed	‘N’ or ‘n’	Apartment::rollHouseDie()
		Person::addMoney()
			“Player’s original money: 100 “
			“player’s new money: 100”
				“Player’s original money: 100 “
				“player’s new money: 100”

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Design/Implementation 8: Creating the School Space

- Developed Menu
- Added in degree() which allows a player to earn their degree
- Added in physDeg() which allows a player to pick up the physical degree and keep it in their container
- Added in payLoans() which allows a player to pay back their loans incurred by going to school

School.cpp file:

```
Int Menu()
    CREATE int input
    CREATE double loans

    DISPLAY “Please choose option:
        1) get degree
        2) pay student loans off
        3) pick up physical degree
        4) exit
    SET input = cin

    IF (input is 1)
        CALL degree()
    IF (input is 2)
        CALL payLoans()
    IF (input is 3)
        CALL physDeg()
    ELSE
        DISPLAY “now leaving school”

Void degree()
    CREATE char ans
    CREATE bool answered
    CREATE double result
    CREATE int result2
    CREATE new diceMod
    CALL die1’s settSideCount()
        SEND 3

    CREATE array of char
```

```
                SET equal to ‘b’, ‘a’, ‘a’

            DISPLAY “Student Loans will be $500. This is added to your account”
            CALL player1’s addStudentLoans()
                SEND 500

            SET result = die1’s rollDie()
            SET result2 = static cast of result

            SWITCH (result2)
                CASES 1 through 3:
                    DISPLAY Question
                    SET ans = cin
                    IF (ans = array[0])
                        DISPLAY “Correct! “
                        SET answered = true
                    ELSE
                        DISPLAY “Sorry, that’s wrong”
                        SET answered = false
                    Break

            IF (answered is true)
                DISPLAY “Congrats! You earned your degree. Pick it up by choosing
                option 3 in school menu”
                SEND answered to player1’s setDegree()
                SEND answered to player1’s setPhysDeg()
            ELSE
                DISPLAY “You did not earn your degree. Please try again but note that
                another student loan will be charged to your account”


        Void physDeg()
            IF (player’s getPhysDeg() is true)
                DISPLAY “your degree has been added to your container of items”
                CALL player1’s addContainer()
                    SEND “Physical Degree”
            ELSE
```

```
                DISPLAY "you have not earned your degree yet"



        Void payLoans()
            CREATE double amount
            CREATE double loans
                SET loans = player1's getStudentLoans()

            IF (loans >= 0.01)
                DISPLAY "you have && left to pay. Enter amount you want to pay: "
                SET amount = cin

                SET amount = (-1)*amount
                CALL player1's addStudentLoans()
                    SEND amount
                DISPLAY "thank you"

            ELSE
                DISPLAY "you do not have any loans"
```

Test Plan 8:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome

School menu Displays when menu function is called	nwRm->menu()	List::move()
		School::menu()
			"You are at school…."	"You are at school…."

Degree Menu calls roll die function	1	School::degree()
		DiceMode::rollDie()
			"You rolled a X"	"You rolled a X"

Degree recognizes correct answers	Q1: b	School::degree()	"Correct!"	"Correct!"
Correct answer results in degree	Q1: b	School::degree()	"Congrats!..."	"Congrats!..."
Wrong answer does not result in degree	Q1: c	School::degree()	"Sorry…"	"Sorry…"
physDeg recognizes if you've earned your degree	3	School::physDeg()	"Degree has been added…"	"Degree has been added…"

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physDeg successfully adds degree to Person container	3	School::physDeg() Person::getContainer()	"Item 0: Physical Degree"	"Item 0: Physical Degree"
payLoans displays correct balance	2	School::payLoans() Person::getStudentLoans()	"you have X left to pay"	"you have X left to pay"
payLoans removes desired amount from student loans	500	School::payLoans() Person::addStdntLns()	"500 has been discounted…"	"500 has been discounted…"
payLoans removes paid amount from bank account	500	School::payLoans() Person::addMoney()	Money is 500 less	Money is 500 less

Design/Implementation 9: Retirement Community

- Developed Menu
- Added in verify() which checks the person's requirements to make sure they were met.
- Added in endGame() which ends the game if the player met requirements

```
Retire.cpp file:
    Void Menu()
        DISPLAY "Welcome. Let us make sure you've met our reqs"
        CALL verify()

    Void verify()
        IF (player1's getDegree() = false)
            DISPLAY "You did not receive a degree. Go back."
        IF (player1's getHouse() = false)
            DISPLAY "You did not buy a house. Go back"
        IF (player1's getBonus() = false)
            DISPLAY "You did not get a bonus. Go back"
        ELSE IF (player1's getMoney() < 1000)
            DISPLAY "You do not have enough money. Go back"
        ELSE
            DISPLAY "Congrats! You meet the reqs"
            CALL endGame()

    Void endGame()
        CALL player1's setEnd()
            SEND true
```

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Test Plan 9:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome
Recognizes no house	House = false	Verify()	“you do not have a house”	“you do not have a house”
Recognizes no marriage	Marriage = false	Verify()	“you did not get married”	“you did not get married”
Recognizes no degree	Degree = false	Verify()	“you did not get a degree”	“you did not get a degree”
Recognizes no bonus	Bonus = false	Verify()	“you did not get a bonus”	“you did not get a bonus”
Recognizes when all flags are true	House = marriage = degree = bonus = true	Verify()	“all reqs met”	“all reqs met”

Design/Implementation 10: Creating House Space

- Developed Menu()
- Added in Cook() which provides 3 different scenarios
- Added in newspaper() which allows you to pick up the newspaper to read.

```
House.cpp
    Void Menu()
        Do {
            DISPLAY “choose between cooking, reading newspaper, leaving”
            SET input = cin
            IF (input is 1)
                CALL cook()
            IF (input is 2)
                CALL newspaper()
        } while (input is not 3)

    Void cook()
        CREATE new dice object
        CALL dice’s setSideCount()
            SEND 3
        CREATE double result
        CREATE double result2

        SET result = die1’s rollDie()
        SET result2 = static cast of result
```

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```
        SWITCH (result2)
            CASE 1:
                DISPLAY “spaghetti incident…cleaning supply…. Find $5”
                CALL player1’s addMoney()
                    SEND 5
                break
            CASE 2:
                DISPLAY “must order pizza. Pay $10”
                CALL player1’s addMoney()
                    SEND -$10
                Break
            CASE 3:
                DISPLAY “spaghetti cooking went great!”
                Break


    Void newspaper()
        CREATE int input
        CREATE string *s = new string
        INCREMENT visitCount
        DISPLAY “Newspaper has been added to your container. Classified wants you to sell
        plasma for $300. Interested? Can only do every 4th house visit“
        SET input = cin

        SET s = player1’s getContainer()
        FOR (int I = 0:1)
            IF (s[i] = “newspaper”
                DISPLAY “newspaper already in container”
            ELSE
                CALL player1’s addContainer()
                    SEND newspaper

        IF (input = yes)
            IF (visitCount <= 3)
                DISPLAY “can only donate every 4th visit”
            ELSE
```

```
                DISPLAY “great! $300 added to account”
                CALL player1’s addMoney()
                    SEND 300
                SET visitCount = 0;
        ELSE
            DISPLAY “You have decided not to donate”
```

Test Plan 10:

Test Case	Input Value	Driver Function	Expected Outcome	Actual Outcome
Money added to account when donating plasma	Y	newspaper()	Money = +300	Money = +300
No plasma option returns to house menu	N	newspaper()	House menu displays	House menu displays
Cooking option randomly generates different scenarios	Cook()	Cook()	Diff scenarios appear	Diff scenarios appear

Design/Implementatioin 11: Lawyer Office

- Developed Menu()
- Added Marriage() which marries the player and their significant other
- Added loanfight() which gives the player a chance to fight to erase their debt

Lawyer.cpp file:

```
    Void Menu()
        CREATE int input
        DO
            DISPLAY “enter 1 to get married” “enter 2 to fight to remove student
            loans” “enter 3 to leave”
            SET inupt = cin
            IF (input is 1)
                CALL marriage()
            IF (input is 2)
                CALL loanfight()
        WHILE (input is not 3)
```

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```
Marriage()
    DISPLAY "you are now married. Congrats!"
    CALL player1's setMarriage()
        SEND true

loanFight()
    DISPLAY "you will battle computer to remove loans. Must pay $50 to pay"
    CALL player1's addMoney()
        SEND -50
    SET you = new BlueMenYou
    SET loanShark = new ReptilePeople
    CREATE double attackRoll
    CREATE bool dead
    CREATE bool youDied
        SET = false
    CREATE double lifeStrength

    DO
        DISPLAY strength of each character by using character's getStrength()
        DISPLAY name of each character by using character's getName()
        CALL boss's attack function
        CALL your defense function
            SEND boss's attack value
        GET your strength after attacks

        CALL your dead function
            IF (dead)
        DISPLAY "You lost. Pay $$ for therapy. "
        SET youdied = true
        ELSE
            CALL your attack function
            CALL boss's defense function
                SEND your attack value

            IF (dead)
                DISPLAY "Boss lost the fight. You get raise!"
                SET youdied = false
    } WHILE (not dead)
    IF (youdied)
```

```
        DISPLAY “your loans are not erased”
    ELSE
        CREATE double m
        DISPLAY “loans are gone”
        SET m = player1’s getStudentLoans()
        CALL player1’s setStudentLoans()
            SEND m
```