Oğuz Akın

22002893

CS101

Algorithms and Programming I

Quiz Project

This is a java project where you can play a game called BattleApp by creating three armies for two alliances to simulate a battle based on various army and battle dynamics.

Army Class

In Army class, you create an Army object taking the following features as parameters: armyName, generalSkill, armyDrill, manpower, armyTradition, technology and firepower.

Variables

armyName: This is the name of your army.

generalSkill: This indicates the skill of the general of your army out of 10 points.

armyDrill: This indicates how trained and combat-ready your army is out of 5 points.

manpower: This shows the number of men in your army.

armyTradition: This indicates both the morale of the army and how familiar your men are to fighting in an army out of 100 points.

technology: This indicates how well equipped and knowledgeable your men are about warfare out of 5 points.

firepower: This indicates the percentage of damage your army can inflict to the enemy in a period of 10 hours and calculated by the formula:
(armyTradition+(armyDrill*technology*generalSkill))/1000

Methods

Getters

getArmyName(): Gets army name, ***getGeneralSkill():*** gets General skill, ***getArmyDrill():*** gets armyDrill, ***getManpower():*** gets manpower, ***getArmyTradition():*** gets armyTradition, ***getTechnology():*** gets technology level, ***getFirepower():*** gets firepower.

Setters

setArmyName(String name): changes the army name to the given parameter,
setGeneralSkill(double skill): changes generalSkill to the given parameter if it is between 0 and 10, if not then assigns the base value of 0.
setArmyDrill(double drill): changes armyDrill to the given parameter if it is between 0 and 5, if not then assigns armyDrill to the base value of 0 points.
setManpower(long man): changes manpower to the given parameter if it is bigger than 0, if not assigns the base value of 1 man.

setArmyTradition(double tradition): changes armyTradition to the given parameter if it is between 0 and 100, if not then assigns armyTradition to base level of 0.1 points.
setTechnology(double tech): changes technology level to the given parameter if it is between 0 and 5, if not then assigns technology to 0.25 base technology level.

Service Methods

void calculateFirepower(): calculates the firepower for a specific army using the formula of firepower.

String toString(): returns the string representation of an army using its features stated above.

Battle Class

In this class you simulate a battle using the manpower and firepower features of two alliances, calculate how many days or hours this battle will go on according to the battle ground and calculate who the winner alliance is. This class does not have setter methods as its variables are determined by the values passed as parameters.

Variables

double manpower1: This is the manpower of the first alliance.

double manpower2: This is the manpower of the second alliance.

double firepower1: This is the cumulative firepower, which is calculated at the **BattleApp** class, of the first alliance.

double firepower2: This is the cumulative firepower, which is calculated at the **BattleApp** class, of the second alliance.

battleSpeed: This is the battle speed, used to change firepower period by multiplying with **battleHours**, determined according to the battle ground.

int battleground: This is the choice, which is asked in the **BattleApp** class, of battle ground based on three choices:

1) **Plains:** In plains, the battle becomes faster and the **battleSpeed** becomes 0.5 . So, the amount of firepower is now inflicted two times faster, in 5 hours which is the half of the original period that it takes to inflict the firepower.
2) **Marshlands:** In marshlands, the battle becomes bogged down as the soil is slippery. **battleSpeed** becomes 2. So the period to inflict the amount of firepower becomes two times slower, 20 hours which is the double of the original period.
3) **Mountains:** In mountains, the battle becomes slower as positions on hills are hard to capture for armies. **battleSpeed** becomes 1.5 . So the period to inflict firepower becomes 1.5 of the original period, 15 hours.

int winnerAlliance: This indicates the winner alliance with the values of 1 and 2. If it is 3, then both sides have retreated from the battle field and there is no clear winner.

battleHours: This indicates the number of hours other than days the battle lasted.

battleDays: This indicates the number of days the battle lasted.

Methods

Getters

int getWinner(): gets the **winnerAlliance**, double **getBattleHours():** gets the **battleHours**,
double getManpower1(): gets the manpower of the first alliance,
double getManpower2(): gets the manpower of the second alliance,
double getBattleSpeed(): gets the **battleSpeed** modifier,
int getBattleDays(): gets the days battle lasted,
double getFirepower1(): gets the firepower of the first alliance,
double getFirepower2(): gets the firepower of the second alliance.

Service Methods

void battleSpeedDecider(): This decides the battleSpeed modifier according to integer choice of battleground. If it is plains(1), then battleSpeed becomes 0.5 . If it is marshlands(2), then battleSpeed becomes 2. If it is mountains(3), then it becomes 1.5 .

void battleTimeAndWinnerCalculator(): This determines the winner and time passed during the battle. To win both armies have to inflict casualties to their enemies according to their firepower. Each firepower period, their manpower is decreased by the multiplication of their manpower and the enemy's firepower. Each period is 10 hours and **battleHours** is increased by 10 hours each period. If one alliance hits to %20 of their original manpower they have to retreat and the other alliance wins. If they both hit %20 at the same period, then both sides retreat and there is no clear winner.

void calculateBattleDay(): While the **battleHours** is more than 24 hours, **battleDays** become incremented and **battleHours** become decreased by 24.

String toString(): This method returns the String representation of the battle, alliances, winner and duration.

BattleApp

This is the main method of BattleApp. In here Army objects and two alliance ArrayLists are created with user inputs, total manpowers of alliances and their cumulative firepowers are calculated and the battle is presented.

Methods

static ArrayList<Army> allianceFiller(ArrayList<Army> alliance): Here user inputs variables of an Army object for three times as an alliance contains three armies. Each time an Army is created, it is added to the alliance array list.

static long getTotalManpower(ArrayList<Army> armies): Here, the total manpower for a specified alliance is calculated by taking each Army manpower from array list.

static double calculateCumulativeFirepower(ArrayList<Army> armies): Here, the cumulative firepower of a specific alliance is calculated from every Army objects according to the formula: (firepower1 * manpower1 + firepower2 * manpower2 + …) / totalManpower

SAMPLE OUTPUT

-Alliance1-

What is the name of this army: BritishArmy

Manpower: 12000

Technology(x/5): 5

Army Tradition(x/100): 100

General Skill(x/10): 10

Army Drill(x/5): 5

What is the name of this army: FrenchArmy

Manpower: 25000

Technology(x/5): 1

Army Tradition(x/100): 1

General Skill(x/10): 1

Army Drill(x/5): 1

What is the name of this army: ItalianArmy

Manpower: 2500

Technology(x/5): 5

Army Tradition(x/100): 75

General Skill(x/10): 3

Army Drill(x/5): 5

-Alliance2-

What is the name of this army: GermanArmy

Manpower: 15000

Technology(x/5): 5

Army Tradition(x/100): 100

General Skill(x/10): 10

Army Drill(x/5): 5

What is the name of this army: JapaneseArmy

Manpower: 20000

Technology(x/5): 4

Army Tradition(x/100): 85

General Skill(x/10): 8

Army Drill(x/5): 4

What is the name of this army: ChineseArmy

Manpower: 7500

Technology(x/5): 3

Army Tradition(x/100): 45

General Skill(x/10): 6

Army Drill(x/5): 4

Select the battle ground: 1)Plains, 2)Marshlands or 3)Mountains ?

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-Alliance1-

Army Name: BritishArmy Manpower: 12000 Firepower: 0.35 Army Tradition: 100.0 General Skill: 10.0 Technology: 5.0 Drill: 5.0

Army Name: FrenchArmy Manpower: 25000 Firepower: 0.002 Army Tradition: 1.0 General Skill: 1.0 Technology: 1.0 Drill: 1.0

Army Name: ItalianArmy Manpower: 2500 Firepower: 0.15 Army Tradition: 75.0 General Skill: 3.0 Technology: 5.0 Drill: 5.0

Total Manpower: 39500.0 Cumulative Firepower: 0.11708860759493671

-Alliance2-

Army Name: GermanArmy Manpower: 15000 Firepower: 0.35 Army Tradition: 100.0 General Skill: 10.0 Technology: 5.0 Drill: 5.0

Army Name: JapaneseArmy Manpower: 20000 Firepower: 0.213 Army Tradition: 85.0 General Skill: 8.0 Technology: 4.0 Drill: 4.0

Army Name: ChineseArmy Manpower: 7500 Firepower: 0.117 Army Tradition: 45.0 General Skill: 6.0 Technology: 3.0 Drill: 4.0

Total Manpower: 42500.0 Cumulative Firepower: 0.24441176470588236

Winner alliance is: Alliance2

This battle has lasted 1 days and 6.0 hours.