C++ OOP – Exam (12 September 2021)

Write C++ code for solving the tasks on the following pages.

Code should compile under the C++11 standard.

Submit your solutions here: https://judge.softuni.org/Contests/3151/CPlusPlus-OOP-Regular-Exam-12-September-2021

Only source code will be accepted as solution for each task.

Task 3 – Diablo

Time for some classics! What else if not the father of all hack n slash RPGs?
Dive in the world of Diablo where the mighty Barbarian is stuck in a deadly battle versus the swift Amazon.

Your task is to study the code and implement the missing functionalities.

General rules

- The game consists of 2 heroes. Barbarian with index 0 and Amazon of index 1.
- Each hero has 3 attributes. Health, mana and manaRegenRate. If you don't know what mana is, think of it as "currency" needed to cast a spell

```
struct VitalData {
  int health { 0 };
  int currMana { 0 };
  int maxMana { 0 };
  int manaRegenRate { 0 };
};
```

- The heroes take turns attacking each other. First the Barbarian attacks the Amazon, then the Amazon attacks the Barbarian, etc…
- A simply turn consists of: one of the heroes' attacks, the other defends and after that the attackers regains some mana (based on his/hers manaRegenRate). NOTE: A hero mana can not exceed it's maximum value.
- The game is played until one of the heroes dies (his/hers) health indicator becomes 0 (or below zero)
- Each hero has 2 active spells and a passive spell.
- Active spell means something the hero acts (attacks) with
- Passive spell means a bonus that the hero can add to his/hers attack or defends
- The stronger active spell requires mana to be casted.
- When the hero attacks, if he/she has enough mana for his stronger spell – he/she always casts that spell and the required mana for the spell is subtracted from his/her mana pool.
- If the hero has no enough mana for his stronger spell – he/she uses the weaker spell. The weaker spell requires no mana (can be casted for 0 mana).
- Each spell has the following attributes:

```
struct SpellData {
  std::string name;
  int damage { 0 };
  int manaCost { 0 };
```

```
};
```

Heroes' passive abilities

Barbarian

Each 3rd defends of the Barbarian results in the hero blocking half of the incoming damage.

Example: let's assume that the barbarian will always be attacked with 20 damage

On his defends number 1 and 2 he takes 20 damage

On his defends number 3 he takes 10 damage

On his defends number 4 and 5 he takes 20 damage

On his defends number 6 he takes 10 damage

Amazon

Each 2nd attack of the has 25% increased damage.

Example: let's assume that the Amazon will always be dealing with 40 damage

On her attack number 1 she deals 40 damage

On her attack number 2 she deals 50 damage

On her attack number 3 she deals 40 damage

On her attack number 4 she deals 50 damage

Input

The first 1st and 2nd rows of data representing the VitalData for each Hero.

Each of those rows represents the hero "health", "maxMana" and "manaRegenRate" in that order.

The 3rd and 4th rows of data represents the Barbarian spells.

The 3rd row is his weaker spell – "spellName" and "spellDamage"

The 4th row is his stronger spell – "spellName" , "spellDamage" and "spellManaCost"

The 5th and 6th rows of data represents the Amazon spells.

The 5th row is her weaker spell – "spellName" and "spellDamage"

The 6th row is her stronger spell – "spellName" , "spellDamage" and "spellManaCost"

Output

You need to generate 3 prints for each turn of the game.

- In the hero "castSpell()" method you should print:

"**Hero** casting **spellName** for **manaCost** mana**"**

Where:

Hero – the name of the attacking hero (Barbarian or Amazon)

spellName – the name of the spell that is being casted

manaCost – what is the cost of the current spell that is being casted

- In the hero "takeDamage()" method you should print:

"**Hero** took **D** damage and is left with **H** health**"**

Where:

Hero – the name of the attacking hero (Barbarian or Amazon)

D – the damage the hero is receiving from his opponent

H – the health that the hero is left with after the attack

- In the hero "renenerate()" method you should print:

"**Hero** egained **M** mana for up to **T"**

Where:

Hero – the name of the attacking hero (Barbarian or Amazon)

M – regained mana by the hero

H – current mana of the hero after the regeneration

Restrictions

Hero mana cannot be negative – 0 is the minimum

Hero mana cannot exceed the hero max mana value

The damage of each of the heroes' spells is **guaranteed** to be divisible by 4 with no remainder.
Example: 4, 44, 72, 112

Time limit: 500ms (0.50s)
Memory limit: 16 MB

Examples

Input	Output
100 50 5 120 40 8	===== Staring turn 1 ===== Barbarian casting Whirlwind for 30 mana Amazon took 44 damage and is left with 76 health

<table>
<tr><td>

```
Bash 24
Whirlwind 44 30
PowerStrike 28
LightningArrow 60 20
```

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```
Barbarian regained 5 mana for up to 25

===== Staring turn 2 =====
Amazon casting LightningArrow for 20 mana
Barbarian took 60 damage and is left with
40 health
Amazon regained 8 mana for up to 28

===== Staring turn 3 =====
Barbarian casting Bash for 0 mana
Amazon took 24 damage and is left with 52
health
Barbarian regained 5 mana for up to 30

===== Staring turn 4 =====
Amazon casting LightningArrow for 20 mana
Barbarian took 75 damage and is left with -
35 health
Amazon has won!
```

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<tr><td>

```
190 30 20
140 40 8
Bash 24
Whirlwind 44 30
PowerStrike 32
LightningArrow 60 30
```

</td><td>

```
===== Staring turn 1 =====

Barbarian casting Whirlwind for 30 mana

Amazon took 44 damage and is left with 96
health

Barbarian regained 20 mana for up to 20


===== Staring turn 2 =====

Amazon casting LightningArrow for 30 mana

Barbarian took 60 damage and is left with
130 health

Amazon regained 8 mana for up to 18


===== Staring turn 3 =====

Barbarian casting Bash for 0 mana

Amazon took 24 damage and is left with 72
health

Barbarian regained 10 mana for up to 30


===== Staring turn 4 =====

Amazon casting PowerStrike for 0 mana

Barbarian took 40 damage and is left with
90 health

Amazon regained 8 mana for up to 26


===== Staring turn 5 =====
```

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	Barbarian casting Whirlwind for 30 mana Amazon took 44 damage and is left with 28 health Barbarian regained 20 mana for up to 20 ===== Staring turn 6 ===== Amazon casting PowerStrike for 0 mana Barbarian took 16 damage and is left with 74 health Amazon regained 8 mana for up to 34 ===== Staring turn 7 ===== Barbarian casting Bash for 0 mana Amazon took 24 damage and is left with 4 health Barbarian regained 10 mana for up to 30 ===== Staring turn 8 ===== Amazon casting LightningArrow for 30 mana Barbarian took 75 damage and is left with -1 health Amazon has won!
240 40 10 190 40 15 DoubleSwing 24 Frenzy 44 30 Jab 16 PlagueJavelin 60 30	===== Staring turn 1 ===== Barbarian casting Frenzy for 30 mana Amazon took 44 damage and is left with 146 health Barbarian regained 10 mana for up to 20 ===== Staring turn 2 ===== Amazon casting PlagueJavelin for 30 mana Barbarian took 60 damage and is left with 180 health Amazon regained 15 mana for up to 25 ===== Staring turn 3 ===== Barbarian casting DoubleSwing for 0 mana Amazon took 24 damage and is left with 122 health Barbarian regained 10 mana for up to 30 ===== Staring turn 4 ===== Amazon casting Jab for 0 mana Barbarian took 20 damage and is left with 160 health Amazon regained 15 mana for up to 40

```
===== Staring turn 5 =====
Barbarian casting Frenzy for 30 mana
Amazon took 44 damage and is left with 78
health
Barbarian regained 10 mana for up to 10

===== Staring turn 6 =====
Amazon casting PlagueJavelin for 30 mana
Barbarian took 30 damage and is left with
130 health
Amazon regained 15 mana for up to 25

===== Staring turn 7 =====
Barbarian casting DoubleSwing for 0 mana
Amazon took 24 damage and is left with 54
health
Barbarian regained 10 mana for up to 20

===== Staring turn 8 =====
Amazon casting Jab for 0 mana
Barbarian took 20 damage and is left with
110 health
Amazon regained 15 mana for up to 40

===== Staring turn 9 =====
Barbarian casting DoubleSwing for 0 mana
Amazon took 24 damage and is left with 30
health
Barbarian regained 10 mana for up to 30

===== Staring turn 10 =====
Amazon casting PlagueJavelin for 30 mana
Barbarian took 60 damage and is left with
50 health
Amazon regained 15 mana for up to 25

===== Staring turn 11 =====
Barbarian casting Frenzy for 30 mana
Amazon took 44 damage and is left with -14
health
Barbarian has won!
```