# C++ Advanced – Exam 1 (07 Apr 2019)

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.bg/Contests/1441/CPlusPlus-Advanced-Exam-07-Apr-2019>

Any code files that are part of the task are provided under the folder **Skeleton**.

Please follow the exact instructions on uploading the solutions for each task.

# Task 4 – Warcraft IV

You are given 7 files: main.cpp, Defines.h, Structs.h, Hero.h, Archmage.h, DeathKnight.h and DrawRanger.h.

The classes ‘Archmage’, ‘DeathKnight’ and ‘DrawRanger’ represents your 3 heroes.

Each hero has the following attributes:

* name – name of the character;
* maxMaxa – the character mana pool for casting spells. (If you don’t know what ‘mana’ is – think of it as a currency required to cast a spell).
* baseManaRegenRate – tell you how much mana points your character restores when an ActionType::REGENERATE\_MANA is performed. Keep in mind that your character can **NOT** have more mana points than his “maxMaxa”. Your character can restore mana points **UP** to his “maxMaxa”.

**NOTE**: The **Archmage** class has a special bonus attribute: “manaRegenModifier”, which scales up his mana regeneration (multiplies baseManaRegenRate to manaRegenModifier) each time the character performs an ActionType::REGENERATE\_MANA.

Each character has his unique BASIC and ULTIMATE spells that are already predefined.

struct Spell {

std::string name; //name of the spell

int manaCost; //mana requirement to cast this spell

};

You are given the main() function, which first populates Archmange, DeathKnight and DrawRanger classes constructors and then reads a single integer value of memory (N).

* The next N whitespace separated integer are special ActionType commands;

enum ActionType {

CAST\_BASIC\_SPELL,

CAST\_ULTIMATE\_SPELL,

REGENERATE\_MANA

};

* “0” or ActionType::CAST\_BASIC\_SPELL command – all heroes should **TRY** to casts their BASIS spells (if they have enough mana points);
* “1” or ActionType::CAST\_ ULTIMATE \_SPELL command – all heroes should **TRY** to casts their ULTIMATE spells (if they have enough mana points);
* “2” or ActionType::REGENERATE\_MANA command – all heroes should use their ability to regenerate mana;

Your task is to study the provided Skeleton and implement the missing functionalities for Archmage.cpp, DeathKnight.cpp and DrawRanger.cpp files with a few things in mind:

After each ActionType::CAST\_BASIC\_SPELL or ActionType::CAST\_ULTIMATE\_SPELL each hero should print to the console a result of his actions.

* For successful cast you should print: ‘spell name’ casted for ‘spell mana’ followed by a **newline**.
* For unsuccessful cast you should print: ‘spell name’ – not enough mana to cast ‘spell name’ followed by a **newline**.

Note: ActionType::REGENERATE\_MANA does **NOT** print any result to the console.

**Special hero abilities**:

* Archmage – if SpellType::ULTIMATE is successfully casted the Archmage gets **immediately** a free ActionType::REGENERATE\_MANA.
* DeathKnight – if SpellType::ULTIMATE is successfully casted the DeathKnight gets **immediately** a free ActionType::CAST\_BASIC\_SPELL. **Important note**: on the free basic cast spell you should print to the console – ‘spell name’ casted for 0 mana.
* DrawRanger – if SpellType::BASIC is successfully casted the DrawRanger gets **immediately** a free ActionType::CAST\_BASIC\_SPELL. **Important note**: on the free basic cast spell you should print to the console – ‘spell name’ casted for 0 mana.

Your task is to study the code and implement the function so that the code accomplishes the task described.

You should submit a single .zip file for this task, containing **ONLY** the files you created.

The Judge system has a copy of the other files and will compile them, along with your file, in the same directory.

### Restrictions

**All** heroes **at any time** can have mana points from **[0, individual ‘maxMana’]** inclusively;

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Archmage 480 80 2  DeathKnight 420 70  DrawRanger 360 60  0 1 | Archmage casted Water Elemental for 120 mana  DeathKnight casted Death Coil for 75 mana  DrawRanger casted Silence for 90 mana  DrawRanger casted Silence for 0 mana  Archmage casted Mass Teleport for 180 mana  DeathKnight casted Animate Dead for 200 mana  DeathKnight casted Death Coil for 0 mana  DrawRanger casted Charm for 150 mana |
| Values 180 50 3  Are-not 220 80  Hardcoded 160 90  1 1 | Values casted Mass Teleport for 180 mana  Are-not casted Animate Dead for 200 mana  Are-not casted Death Coil for 0 mana  Hardcoded casted Charm for 150 mana  Values - not enough mana to cast Mass Teleport  Are-not - not enough mana to cast Animate Dead  Hardcoded - not enough mana to cast Charm |
| ConjurusRex 280 80 1  Arthas 320 40  Sylvanas 160 50  1 2 2 1 | ConjurusRex casted Mass Teleport for 180 mana  Arthas casted Animate Dead for 200 mana  Arthas casted Death Coil for 0 mana  Sylvanas casted Charm for 150 mana  ConjurusRex casted Mass Teleport for 180 mana  Arthas casted Animate Dead for 200 mana  Arthas casted Death Coil for 0 mana  Sylvanas - not enough mana to cast Charm |