

IF184101 Basic Programming (F)

Final Exam

Starting date: 25 October 2019
Deadline: 01 November 2019, 23:59 WIB. **Penalty: 0.15% of grade/minute of tardiness.**
Exam type: Open
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IF184101_BASPRO_F_FIN_StudentID_Name
File type and format: A zip file containing all of the .c source files & the declaration
Filename format: IF184101_BASPRO_F_FIN_StudentID_Name.ZIP

Instruction

Please do these steps as in the following.

1. Please create a program, namely `01_chess_pieces.cpp`. At the beginning of the program, please write down the codes as in the following. Then continue the codes for `class Rook, Bishop, Queen, and Knight` like the `Pawn` class below. All classes should have `x = 0, y = 0` as their initial locations. **[25 points]**

Code:

```
#include <iostream>
#include <cmath>

using namespace std;

class Piece {
protected:
    int faction; //faction is 1 for white and -1 for black
    int x; int y;
    char * name;
public:
    void getLocation(){
        cout << name << " is at x: " << x << " y: " << y << endl;
    }
    bool moveCondition (int x_dest, int y_dest);
    void move(int x_dest, int y_dest);
};

class Pawn : public Piece {
public:
    Pawn (int f) { //constructor is not inherited
        name = "Pawn";
        faction = f;
        x = 0;
        y = 0;
    }
    bool moveCondition(int x_dest, int y_dest) {
        return ((x_dest == x) && ((y_dest - y)==(1 * faction)));
    }
}
```

```

void move(int x_dest, int y_dest) {
    if (moveCondition (x_dest, y_dest)) {
        x = x_dest;
        y = y_dest;
        getLocation();
    } else {
        cout << "invalid move" << endl;
    }
}
};

```

Hint:

- Move condition for Rook is in the following.
 $((x_dest \neq x) \wedge (y_dest \neq y))$
- Move condition for Bishop is in the following.
 $((x_dest - x) == (y_dest - y)) \wedge (y_dest - y \neq 0) \wedge (x_dest - x \neq 0)$
- Move condition for Knight is in the following.
 $((abs(x_dest - x) == 2) \wedge (abs(y_dest - y) == 1) \vee (abs(x_dest - x) == 1) \wedge (abs(y_dest - y) == 2))$
- Move condition for Queen is in the following.
 $((abs(x_dest - x) == abs(y_dest - y)) \wedge ((y_dest - y \neq 0) \wedge (x_dest - x \neq 0)) \vee ((x_dest \neq x) \wedge (y_dest \neq y)))$

2. Please create a program, namely 02_overloading.cpp. At the beginning of the program, please write down the codes as in the following. Then continue the codes by creating overloading of the class for adding three, four, and five variables. [25 points]

Hint:

```

int add(int a, int b){
    return a+b;
}

```

3. Please create a program, namely 03_anagram.cpp. The main purpose of the program is to search the total number of the pattern and its anagram inside a string and print them alongside their location. Please utilize a function called is_permutation() in a C++. [25 points]

Example:**Input:**

```

String: aabaabaa
Pattern: aaba

```

Output:

```

Anagram:
aaba at index 0
abaa at index 1
aaba at index 3
abaa at index 4

```

Hint:

Please use the almighty header `<bits/stdc++.h>`

4. Please create a program, namely `04_calculator.cpp`. The calculator must implement OOP Class and have at least 8 different operations and only accept 2 numbers as inputs (no chain operation). **[25 points]**
5. To avoid plagiarism/cheating, every student needs to pledge and declare, then she/he must submit her/his **signed pledge and declaration** as in the following. Failed to do so will be resulted in getting 0 (zero) grade. Attach the **scanned/photo** of your *declaration* in your report.

“By the name of Allah (God) Almighty, herewith I pledge and truly declare that I have solved final exam by myself, didn’t do any cheating by any means, didn’t do any plagiarism, and didn’t accept anybody’s help by any means. I am going to accept all of the consequences by any means if it has proven that I have been done any cheating and/or plagiarism.”

[Place, e.g., Surabaya], [date, e.g., 01 November 2019]

<Signed>

[Full name, e.g., Rahayu Larasati]

[StudentID, e.g., 05111940000xxx]

6. ZIP the files of `01_chess_pieces.cpp`, `02_overloading.cpp`, `03_anagram.cpp`, `04_calculator.cpp`, and your declaration (e.g., Declaration.PDF) into 1 (one) only .ZIP file, namely IF184101_BASPRO_F_FIN_StudentID_Name.ZIP. Send this .ZIP file to yifana@gmail.com and CC-ed to muhammadryandanm@gmail.com.

8. Have a wonderful lovely day, folks! Good luck! 😊