به نام خدا

دانشکده

مهندسی مکانیک

برنامه سازی کامپیوتر

Assignment 1

استاد درس:

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زمان تحویل:

۱۴۰۱/۰۱/۰۵

- کدها را فقط به فرمت ".cpp" قرار داده و از فرستادن کل پروژه یا فایل‌های اضافی خودداری کنید.
- تمامی فایل‌ها را در یک فایل ".zip" و یا ".rar" ذخیره کرده و به شکل "AS1_ID_LastName" در سایت بارگذاری کنید.

برای مثال برای فردی با نام خانوادگی کریمی و شماره دانشجویی ۹۹۱۲۳۴۵ نام فایل "AS1_9912345_Karimi" خواهد بود.

1. Rewrite the following code fragments so that a nested if/else is used instead of the conditional operator.

a)
```
int a=5 , b=6 , c=-4 , d;
d = (++a <= b--)&&(a++ >= b++) ? c++:a;
cout << "a=" << a << "\nb=" << b << "\nd=" << d << "\nc=" << c;
```
```
7
6
-4
-3
```

b)
```
int a=5 , b=6 , c=7 , d;
d = (++a == b--)&&(a++ >= --c) ? c+a++:--a-c;
cout << "a=" << a << "\nb=" << b << "\nd=" << d << "\nc=" << c;
```
```
8
5
13
6
```

2. Rewrite the following code fragments so that a multi-way if/else is used instead of the switch statement.

a)

```
int value;
char ch;
std::cin >> ch;
switch( ch) {
case 'A':
value = 10;
break;
case 'P':
std::cin >> value;
break;
case 'T':
value = ch;
break;
case 'V':
value = ch + 1000;
break;
default:
value = 50;
}
std::cout << value << '\n';
```

b)

```
int value;
char ch;
std::cin >> ch;
switch (ch) {
case 'A':
std::cout << ch << '\n';
value = 10;
break;
case 'P':
case 'E':
```

```
std::cin >> value;
break;
case 'T':
std::cin >> ch;
value = ch;
case 'C':
value = ch;
std::cout << "value=" << value << ", ch=" << ch << '\n';
break;
case 'V':
value = ch + 1000;
break;
}
std::cout << value << '\n';
```

3. Rewrite the code written in TA class to check whether the given alphabet is a vowel or a constant; so that the ASCII code is used instead of characters themselves.

4. Redesign the code written in TA class so that it draws a sideways tree pointing left; instead of asterisks number of elements in each line should be printed.
   For example, if the user enters 5, the program would print:

```
    1
   22
  333
 4444
55555
 4444
  333
   22
    1
```

   Input Validation: Do not accept a negative integer or an integer bigger than 9.

5. Write a program with a loop that lets the user enter a series of integers. The user should enter -99 to signal the end of the series. After all the numbers have been entered, the program should display the largest and smallest numbers entered.

6. Write a program that generates a random number and asks the user to guess what the number is. If the user's guess is higher than the random number, the program should display "Too high, try again." If the user's guess is lower than the random number, the program should display "Too low, try again." The program should use a loop that repeats until the user correctly guesses the random number.

7. The distance a vehicle travels can be calculated as follows:

   distance = speed * time

   For example, if a train travels 40 miles per hour for 3 hours, the distance traveled is 120miles.
   Write a program that asks the user for the speed of a vehicle (in miles per hour) and how many hours it has traveled. The program should then use a loop to display the distance the vehicle has traveled for each hour of that time period. Here is an example of the output:

   ```
   What is the speed of the vehicle in mph? 40
   How many hours has it traveled? 3
   Hour Distance Traveled
   -------------------------------
   1 40
   2 80
   3 120
   ```

   Input Validation: Do not accept a negative number for speed and do not accept any value less than 1 for time traveled.