Ex 1
Code:

```cpp
#include <iostream>
using namespace std;

bool isVowel(char ch);

int main() {
    char ch;
    int ans;
    cout << "Enter a character: ";
    cin >> ch;
    cout << endl;
    ans = isVowel(ch);
    if (ans) {
        cout << ch << " is a vowel.";
    }
    else {
        cout << ch << " is not a vowel.";
    }
    return 0;
}

bool isVowel(char ch) {
    switch (ch) {
    case 'A':
    case 'E':
    case 'I':
    case 'O':
    case 'U':
    case 'a':
    case 'e':
    case 'i':
    case 'o':
    case 'u':
        return true;
    default:
        return false;
    }
}
```

Output:

```
Enter a character: a

a is a vowel.
```

Ex2

Code:

```cpp
#include <iostream>
using namespace std;
int reverseDigit(int num);

int main() {
    int num;
    cout << "Enter a number to reverse: " << endl;
    cin >> num;
    cout << reverseDigit(num);
    return 0;
}

int reverseDigit(int num) {
    bool isNeg = num < 0;
    if (isNeg) {
        num *= -1;
    }
    int reversed = 0;
    while (num > 0) {
        reversed *= 10;
        int temp = num % 10;
        reversed += temp;
        num /= 10;
    }
    if (isNeg) {
        reversed *= -1;
    }
    return reversed;
}
```

Output:

```
Enter a number to reverse:
54321
12345
```

```
Enter a number to reverse:
5600
65
```

```
Enter a number to reverse:
7008
8007
```

```
Enter a number to reverse:
-523
-325
```

Ex3
Code:

```cpp
#include <iostream>
using namespace std;

void removeVowels(string& str);
bool isVowel(char ch);

int main() {
    string input;
    cout << "Enter a string: " << endl;
    cin >> input;
    removeVowels(input);
    cout << "Your string with vowels removed: " << input;
    return 0;
}

void removeVowels(string& str) {
    for (int i = 0; i < str.length(); i++) {
        if (isVowel(str[i])) {
            str = str.substr(0,i) + str.substr(i + 1, str.length());
            i--;
        }
    }
}

bool isVowel(char ch) {
    switch (ch) {
    case 'A':
    case 'E':
    case 'I':
    case 'O':
    case 'U':
    case 'a':
    case 'e':
    case 'i':
    case 'o':
    case 'u':
        return true;
    default:
        return false;
    }
}
```

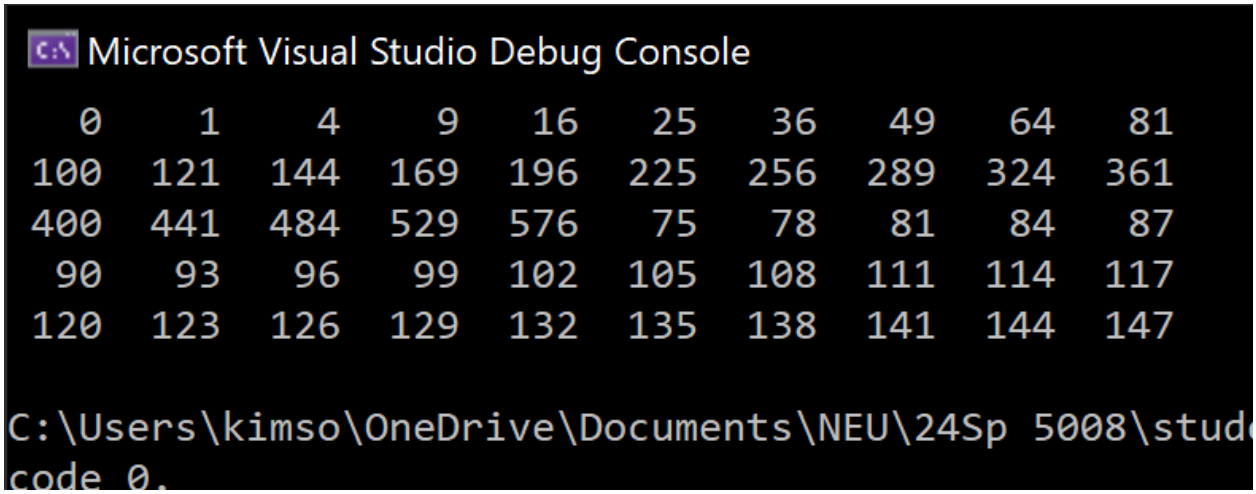
Output:

```
Microsoft Visual Studio Debug Console
Enter a string:
There
Your string with vowels removed: Thr
C:\Users\kimso\OneDrive\Documents\NEU\24Sp
ode 0.
```

Ex4
Code:

```cpp
#include <iostream>
#include <iomanip>
using namespace std;

void initialize(double alpha[], int size);
void print(double alpha[], int size);

int main() {
    double alpha[50];
    initialize(alpha, 50);
    print(alpha, 50);
    return 0;
}

void initialize(double alpha[], int size) {
    for (int i = 0; i < size/2; i++) {
        alpha[i] = i * i;
    }
    for (int i = size/2; i < size; i++) {
        alpha[i] = 3 * i;
    }
}

void print(double alpha[], int size) {
    for (int i = 0; i < 5; i++) {
        for (int j = 0; j < 10; j++) {
            int index = 10 * i + j;
            cout << setw(4) << alpha[index] << ' ';
        }
        cout << endl;
    }
}
```

Output:


Microsoft Visual Studio Debug Console
0 1 4 9 16 25 36 49 64 81
100 121 144 169 196 225 256 289 324 361
400 441 484 529 576 75 78 81 84 87
90 93 96 99 102 105 108 111 114 117
120 123 126 129 132 135 138 141 144 147
C:\Users\kimso\OneDrive\Documents\NEU\24Sp 5008\stud
code 0.

Ex5
Code:

```cpp
#include <iostream>
#include <fstream>
#include <string>
#include <iomanip>
using namespace std;

const int NUM_STUDENTS = 20;

struct studentType {
    string firstName;
    string lastName;
    int testScore;
    char grade;
};

void getData(ifstream& inData, studentType students[], int size);
void calcGrades(studentType students[], int size);
int maxScore(const studentType students[], int size);
void printResults(ofstream& outData, const studentType students[], int size);

int main() {
    studentType students[NUM_STUDENTS];
    ifstream inData;
    ofstream outData;
    inData.open("textinput.txt");
    if (!inData) {
        cout << "File does not exist." << endl;
        return 1;
    }
    outData.open("output.txt");
    if (!outData) {
        cout << "Cannot create output file." << endl;
        return 1;
    }
    getData(inData, students, NUM_STUDENTS);
    calcGrades(students, NUM_STUDENTS);
    printResults(outData, students, NUM_STUDENTS);
    inData.close();
    outData.close();
    return 0;
}
```

```
42
43  void getData(ifstream& inData, studentType students[], int size) {
44      for (int i = 0; i < size; i++) {
45          inData >> students[i].firstName >> students[i].lastName >> students[i].testScore;
46      }
47  }
48
49  void calcGrades(studentType students[], int size) {
50      for (int i = 0; i < size; i++) {
51          switch (students[i].testScore / 10) {
52              case 10:
53                  students[i].grade = 'A';
54                  break;
55              case 9:
56                  students[i].grade = 'B';
57                  break;
58              case 8:
59                  students[i].grade = 'C';
60                  break;
61              case 7:
62                  students[i].grade = 'D';
63                  break;
64              default:
65                  students[i].grade = 'F';
66
67          }
68      }
69  }
70
71  int maxScore(const studentType students[], int size) {
72      int maxScore = 0;
73      for (int i = 0; i < size; i++) {
74          if (students[i].testScore > maxScore) {
75              maxScore = students[i].testScore;
76          }
77      }
78      return maxScore;
79  }
80
```

```
80
81  void printResults(ofstream& outData, const studentType students[], int size) {
82      int max = maxScore(students, size);
83      outData << setw(15) << "Student Name " << setw(10) << "Test Score"
84          << setw(7) << "Grade" << endl;
85      for (int i = 0; i < size; i++)
86          outData << left << setw(25) << students[i].lastName + ", " +
87          students[i].firstName << right << " " << setw(5) << students[i].testScore
88          << setw(6) << " " << students[i].grade << endl;
89      outData << endl << "Highest Test Score: " << max << endl;
90      outData << "Students having the highest test score:" << endl;
91      for (int i = 0; i < size; i++)
92          if (students[i].testScore == max)
93              outData << students[i].lastName + ", " + students[i].firstName << endl;
94  }
95
```

Output:

Output - Notepad

File Edit Format View Help

Student Name	Test Score	Grade
Donald, Duckey	85	C
Goofy, Goof	89	C
Balto, Brave	93	B
Smitn, Snow	93	B
Wonderful, Alice	89	C
Akthar, Samina	85	C
Green, Simba	95	B
Egger, Donald	90	B
Deer, Brown	86	C
Jackson, Johny	95	B
Gupta, Greg	75	D
Happy, Samuel	80	C
Arora, Danny	80	C
June, Sleepy	70	D
Cheng, Amy	83	C
Malik, Shelly	95	B
Tomek, Chelsea	95	B
Clodfelter, Angela	95	B
Nields, Allison	95	B
Norman, Lance	88	C

Highest Test Score: 95
Students having the highest test score:
Green, Simba
Jackson, Johny
Malik, Shelly
Tomek, Chelsea
Clodfelter, Angela
Nields, Allison