

# kimani ward

*by* Kimani Ward

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|                |                                                     |                 |      |
|----------------|-----------------------------------------------------|-----------------|------|
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## Maths for Software Development

I have been employed to work on a new software for a book library. Partially of the functions have already been implemented and it is my job to finish the final piece of functions and code them. I will be implementing these codes allowing the library to have their user's access what they need in just taps away.

I will be giving a copy of my codes showing them in more details and screen grabs:

### Length

```
#define _CRT_SECURE_NO_WARNINGS
#include "stdafx.h"
#include <cstdlib>
#include <iostream>
#include <vector>
#include <ctime>

using namespace std;

void genVector(vector<int> &vect)
{
    srand(time_t{ NULL });
    for (int i = 1; i <= 50; ++i);
    vect.push_back(rand() % 50 + 1);
}

int findVector(vector<int> vect, int value) {
    for (int i = 0; i < vect.size(); ++i)
        if (vect[i] == value)
            return i;
    return -1;
    int found = -1;
    return found;
}

int main()
{
    vector<int> numbers;
    genVector(numbers);
    int found, length;
    printf("Enter a value for Length");
    scanf("%i", &length);
    found = findVector(numbers, length);
    if (found > -1)
        printf("Found the length: \n", found);
    else printf("Couldnt find Length in Vector. \n");

    system("pause");
}
```

```

    return 0;
}

```

The length code allows the user to input a vector value and then this makes the programme calculate a result for the user and gives an output of the result length of the user's vector. In this implementation I have named our variable result as "length", the way this function is designed is to only allow the user to choose a number between 1-50. If the user chooses a value other than stated the program will prompt a display message telling the user "couldn't find find length in vector".

On the other hand if the user in puts a valid value the programme should return with an accurate result of length for the user to note. To allow the programme to choose a number between 1-50 I have implemented the following code to generate numbers between only 1-50:

```

srand(time_t{ NULL });
for (int i = 1; i <= 50; ++i);
vect.push_back(rand() % 50 + 1);

```

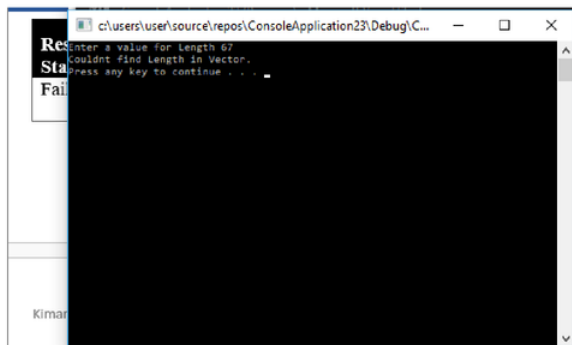
This array allows the program to decide on whether it can output a result that the user has requested or not. If the program can display and give you a result it should display "found the length:"

```

int main()
{
    vector<int> numbers;
    genVector(numbers);
    int found, length;
    printf("Enter a value for Length");
    scanf("%i", &length);
    found = findVector(numbers, length);
    if (found > -1)
        printf("Found the length: \n", found);
    else printf("Couldnt find Length in Vector. \n");

    system("pause");
}

```



## 1 User enters menu option

| Description | The user enters a valid number 1-50<br>If value is invalid |
|-------------|------------------------------------------------------------|
|-------------|------------------------------------------------------------|

|                                                                                           |                                                              |                                                                                |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>Response Status</b>                                                                    | <b>Test Steps :</b>                                          |                                                                                |
|                                                                                           | 1                                                            | Message displayed asking user to enter number                                  |
|                                                                                           | 2                                                            | The number 67 is entered                                                       |
|                                                                                           | The program should display number that the user has entered. |                                                                                |
|                                                                                           | <b>Date</b>                                                  | <b>Description</b>                                                             |
| Pass                                                                                      | 12/04/18<br>13:08                                            | Allows the user to enter a valid number but doesn't display the correct values |
|                                                                                           | 12/04/18<br>13:30                                            | An incorrect error message was displayed warning that the number was not valid |
| <b>1 User enters menu option</b>                                                          |                                                              |                                                                                |
| <b>Description</b> Programme Displays user result                                         |                                                              |                                                                                |
|                                                                                           | <b>Test Steps :</b>                                          |                                                                                |
|                                                                                           | 1                                                            | Message displayed to user with a length result                                 |
|                                                                                           | 2                                                            | Display "found the length"                                                     |
| <b>Response</b> The program should display the result of the length required by the user. |                                                              |                                                                                |
| <b>Status</b>                                                                             | <b>Date</b>                                                  | <b>Description</b>                                                             |
| Fail                                                                                      | 12/04/18<br>13:39                                            | Program did not display the correct result but displayed values.               |
| Pass                                                                                      | 12/04/18<br>13:51                                            | The program did display message "found the length".                            |

## Distance

```

#define _CRT_SECURE_NO_WARNINGS
#include "stdafx.h"
#include <math.h>
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, _TCHAR* argv[])
{
    double x[2], y[2];
    double Pos1, Pos2;
    double total, Distance;

```

```

printf("Enter the first item x position \n");
scanf("%i", &x[0]);
printf("Enter the first item y position \n");
scanf("%i", &y[0]);

printf("Enter the second item x position \n");
scanf("%i", &x[1]);
printf("Enter the second item y position \n");
scanf("%i", &y[1]);

Pos1 = (x[1] - x[0]);
Pos2 = (y[1] - y[0]);
Pos1 *= Pos1;
Pos2 *= Pos2;
Distance = (Pos1 + Pos2);
total = sqrt(Distance);

printf("The distance is: \n", total);

system("pause");

return 0;
}

```

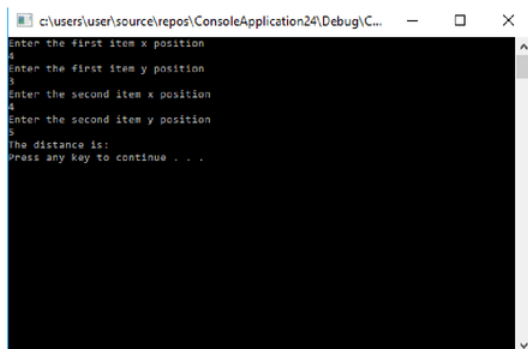
In this programme the function allows the user to input two position of two vectors, then the console records those value and then outputs the angle length between them. So on an x and y graph the console calculates the magnitude between x and y and then out put the result to the user.

Creating this function my two variables are x and y I then implemented a code to allow the program to calculate the users input value of x between y the console then runs the code that helps it decide the amount which it times by 2 and then output the results.

```

Pos1 = (x[1] - x[0]);
Pos2 = (y[1] - y[0]);
Pos1 *= Pos1;
Pos2 *= Pos2;
Distance = (Pos1 + Pos2);
total = sqrt(Distance);

```



## 1 User enters menu option

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| <b>Description</b> | Program should ask the user to enter eac X and Y position for both vector. |
|--------------------|----------------------------------------------------------------------------|

|                        |                                                              |                                                                         |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Response Status</b> | Test Steps :                                                 |                                                                         |
|                        | 1                                                            | Message displayed asking the user to enter x,y position                 |
|                        | 2                                                            | Enters an array of numbers in to the console.                           |
|                        | The program should display number that the user has entered. |                                                                         |
|                        | <b>Date</b>                                                  | <b>Description</b>                                                      |
|                        | 12/04/18<br>14:06                                            | N/A                                                                     |
|                        | 12/04/18<br>14:27                                            | The console did allow the user to enter all positions for both vectors. |

|                    |                                                                           |                                                                                                   |
|--------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>1</b>           | <b>User enters menu option</b>                                            |                                                                                                   |
| <b>Description</b> | Console needs to display each value the user has entered and out a result |                                                                                                   |
|                    | Test Steps :                                                              |                                                                                                   |
|                    | 1                                                                         | Program displays each value the user entered                                                      |
|                    | 2                                                                         | Program should display correct result                                                             |
|                    | The program should display number that the user has entered.              |                                                                                                   |
|                    | <b>Date</b>                                                               | <b>Description</b>                                                                                |
| <b>Fail</b>        | 12/04/18<br>13:08                                                         | The console does not display each number the user has entered and also gives an incorrect result. |
| <b>Pass</b>        | 12/04/18<br>13.30                                                         | Allows the user to enter a valid number but doesn't display the correct values.                   |

## Cross Product

```

#define _CRT_SECURE_NO_WARNINGS
#include "stdafx.h"
#include <math.h>
#include <iostream>
#include <cmath>

using namespace std;

int main(int argc, _TCHAR* argv[])
{
    double a[2], b[2];
    double A[2];
    double result;

```

```

printf("Enter the value for a1:");
scanf("%i", &a[0]);
printf("Enter the value for a2:");
scanf("%i", &a[1]);

printf("Enter the value for b1:");
scanf("%i", &b[0]);
printf("Enter the value for b2:");
scanf("%i", &b[1]);

result = ((a[0] * b[0] + a[1] * b[1]));

printf("The result between Point A & B = \n", result);

system("pause");

return 0;
}

```

| 1    User enters menu option                                              |                                                                                                                                                              |                                                                                 |   |                                              |   |                                           |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---|----------------------------------------------|---|-------------------------------------------|
| Description                                                               | Program ask the user to enter all values for a1 a2 b1 b2                                                                                                     |                                                                                 |   |                                              |   |                                           |
|                                                                           | Test Steps :                                                                                                                                                 |                                                                                 |   |                                              |   |                                           |
|                                                                           | <table><tr><td>1</td><td>Message displayed asking user to enter value</td></tr><tr><td>2</td><td>The user enters numbers for each variable</td></tr></table> |                                                                                 | 1 | Message displayed asking user to enter value | 2 | The user enters numbers for each variable |
|                                                                           | 1                                                                                                                                                            | Message displayed asking user to enter value                                    |   |                                              |   |                                           |
| 2                                                                         | The user enters numbers for each variable                                                                                                                    |                                                                                 |   |                                              |   |                                           |
| Response                                                                  |                                                                                                                                                              |                                                                                 |   |                                              |   |                                           |
| The program should display a result at the end of the users given inputs. |                                                                                                                                                              |                                                                                 |   |                                              |   |                                           |
| Status                                                                    | Date                                                                                                                                                         | Description                                                                     |   |                                              |   |                                           |
| Fail                                                                      | 12/04/18<br>14:50                                                                                                                                            | Program allows user to enter the values but doesn't display the result          |   |                                              |   |                                           |
| Pass                                                                      | 12/04/18<br>15:06                                                                                                                                            | Allows the user to enter a valid number but doesn't display the correct values. |   |                                              |   |                                           |

## Mean Mode

```
#define _CRT_SECURE_NO_WARNINGS
#include "StdAfx.h"
#include <iostream>

using namespace std;

int main()
{
    int user;
    int x = 0;
    float mean;
    float median;
    int mode;
    int range;
    do {
        printf("please enter any number other than 5: \n");

        scanf("%d", &user);
        x++;
        for (int i = 0; i < 10; i++);
        printf("you entered =%d", &user);

    } while (user != 5 && x < 10); {

        if (user == 5) {
            printf(" Invalid! you were'nt suppose to enter that: .\n");

            user = user + user;
            mean = user / x + 1;
            printf("your mean is:%i \n", mean);

            median = user / x + 1;
            if (user % 2 == 0 || user % 2 != 0)
                printf(" your median is :%i \n", median);

        }
        else {

            printf("CONGRATS you won! \n");

            user = user + user;
            mean = user / x + 1;
            printf("your mean is: \n", &mean);

            median = user / x + 1;
            if (user % 2 == 0 || user % 2 != 0)
                printf(" your median is : \n", &median);

        }
    }
}
```

```
system("pause");
```

```
return 0;
}
```

```

C:\Users\user\source\repos\ConsoleApplication27\Debug\C...
x please enter any number other than 5:
p 5
at you entered =5241888 please enter any number other than 5:
at 2
m you entered =5241888 please enter any number other than 5:
r 5
p you entered =5241888 please enter any number other than 5:
{ 7
p you entered =5241888 please enter any number other than 5:
p 5
x you entered =5241888 please enter any number other than 5:
t 5
f you entered =5241888 please enter any number other than 5:
p 7
p you entered =5241888 please enter any number other than 5:
7
hi you entered =5241888 please enter any number other than 5:
2
t you entered =5241888 CONGRATS you won!
t your median is :
t your median is :
t Press any key to continue . . .

```

## Union

```

#include <vector>
#include <iostream>
#include <string>
#include "stdafx.h"
#include <algorithm>

using namespace std;

int main()
{
    vector<int> v1;
    v1.push_back(1);
    v1.push_back(22);
    v1.push_back(5);
    std::sort(v1.begin(), v1.end());

    vector<int> v2;
    v2.push_back(3);
    v2.push_back(41);
    v2.push_back(6);
    v2.push_back(19);
    std::sort(v2.begin(), v2.end());

    vector<int> v3;

    set_union(v1.begin(), v1.end(), v2.begin(), v2.end(), back_inserter(v3,
v3.begin()));

    printf("%i", v1, v2);
    for (vector<int> :: iterator it = v3.begin(); it != v3.end(); it++)
    {
        printf("%i \n", *it);
    }

    return 0;
}

```

Kimani Ward

1706860  
Gordon Dickers

FINAL GRADE

GENERAL COMMENTS

Instructor

27 /100

PAGE 1



**Comment 1**

A SOFTWARE library not a book library.

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6



**Comment 2**

this is not a cross product - it's a dot product.

PAGE 7

PAGE 8

PAGE 9

GRADING FORM: SMU GENERIC\_GJ

KIMANI WARD

26.75

RESEARCH-INFORMED LITERATURE



A limited investigation into the underlying maths and SE principles.

**1.5**

#### KNOWLEDGE AND UNDERSTANDING



I don't think you understand the essential mathematical concepts required for this assignment. The majority of the tasks have not been implemented correctly or in some cases at all.

**5**

#### ANALYSIS



Analysis of the problem and the synthesis of solutions is poor. Test case produced but I don't think you've grasped the underlying principles in a sufficient manner to help you here.

**1.75**

#### PRACTICAL APPLICATION AND DEP.



Code produced does not really solve the majority of tasks. Several tasks omitted and those attempted are incomplete in the majority of cases.

**16**

#### SKILLS FOR PROFESSIONAL PRAC.



Report structured and test cases documented. No refs. Please include references next time.

**2.5**