GEDB029: Basic and Practice in Programming

- Lab 7: Pass by Reference

In this lab ...

❖ Passing variable to functions by reference (address)

❖ Passing an Array to functions

- What you need to submit in this lab (Lab #7):
  - Lab Exercises #7 on iCampus by Thursday 11:59 pm
  - Lab Assignment #7 by Wednesday 11:59 pm

Function Parameters

```
int MyFunction(int x, int y)
{ x = x+1;
  y = y+1;
  return x+y;
}

int main(void)
{ int x = 10, y = 20;
  int result = MyFunction(x,y);
   // What is the value of x, y and result here???
}
```

Modification of value in the function body does not affect the value in the caller

- Reminder: Scope of variable

Pass by reference

You can create a function for which any modification of the parameters' value would affect the value of the caller

This is call pass by reference

- Instead of passing the value of the variable as argument, you're passing the address of the variable

The & operator specify the address of a variable

```
– int x = 10;
– printf("%d",x);    // print out the value of x
– printf("%d",&x);   // print out the address of x
```

When you pass the address of the variable to the function as parameter, any modification of the variable value will be reflected in the caller

Pass by reference

If you want to pass by reference, you need to:

- Specify it in the function prototype
- Specify it in the function definition

```
#include <stdio.h>
void MyFunction(int &x); // Specify parameter x is passing by reference

int main (void)
{ int x = 10;
  printf(“Value of x before MyFunction: %d\n”,x);
  MyFunction(x);        // Function Call
  printf(“Value of x after MyFunction: %d\n”,x);
}

void MyFunction(int &x) // Specify parameter x is passing by reference
{ x = x + 1;
}
```

Pass by reference

You can have a function indirectly returning multiple values using pass by reference

Try this yourself ...

```
#include <stdio.h>
void MyFunction(int &x); // Specify passing by reference

int main (void)
{ int x = 10, y = 20, z = 30;
  printf(“Value before MyFunction: %d %d %d\n”,x,y,z);
  MyFunction(x,y,z);        // Function Call
  printf(“Value after MyFunction %d %d %d: %d\n”,x,y,z);
}

void MyFunction(int &x, int &y, int &z) // Specify passing by reference
{ x = x + 1;
  y = y + 2;
  z = z + 3;
}
```

Pass the entire array as parameter

You need to pass the following to the function

- The address of the array
- The number of item in the array

Try this yourself ...

```
#include <stdio.h>
void Swap(int x[],int size);

int main (void)
{ int x[2] ={3,9};
  printf("Value of x before Swap: %d %d\n",x[0],x[1]);
  Swap(x,2);
  printf("Value of x after Swap: : %d %d\n",x[0],x[1]);
}

void Swap(int x[],int size)
{ int temp = x[0];
  x[0] = x[1];
  x[1] = temp;
}
```

Lab Exercise #7: Array

1. In the main function, create an **one dimensional array** consisting of **15 random integers** in the range of -5 to 50.
2. Print out this one dimensional array.
3. **Write a function** that would take this array as argument **by reference**.
   - Your function returns 3 values by reference:
     - The maximum value of the array
     - The minimum value of the array
     - The sum of the array
4. **In the main function, print out these 3 values**

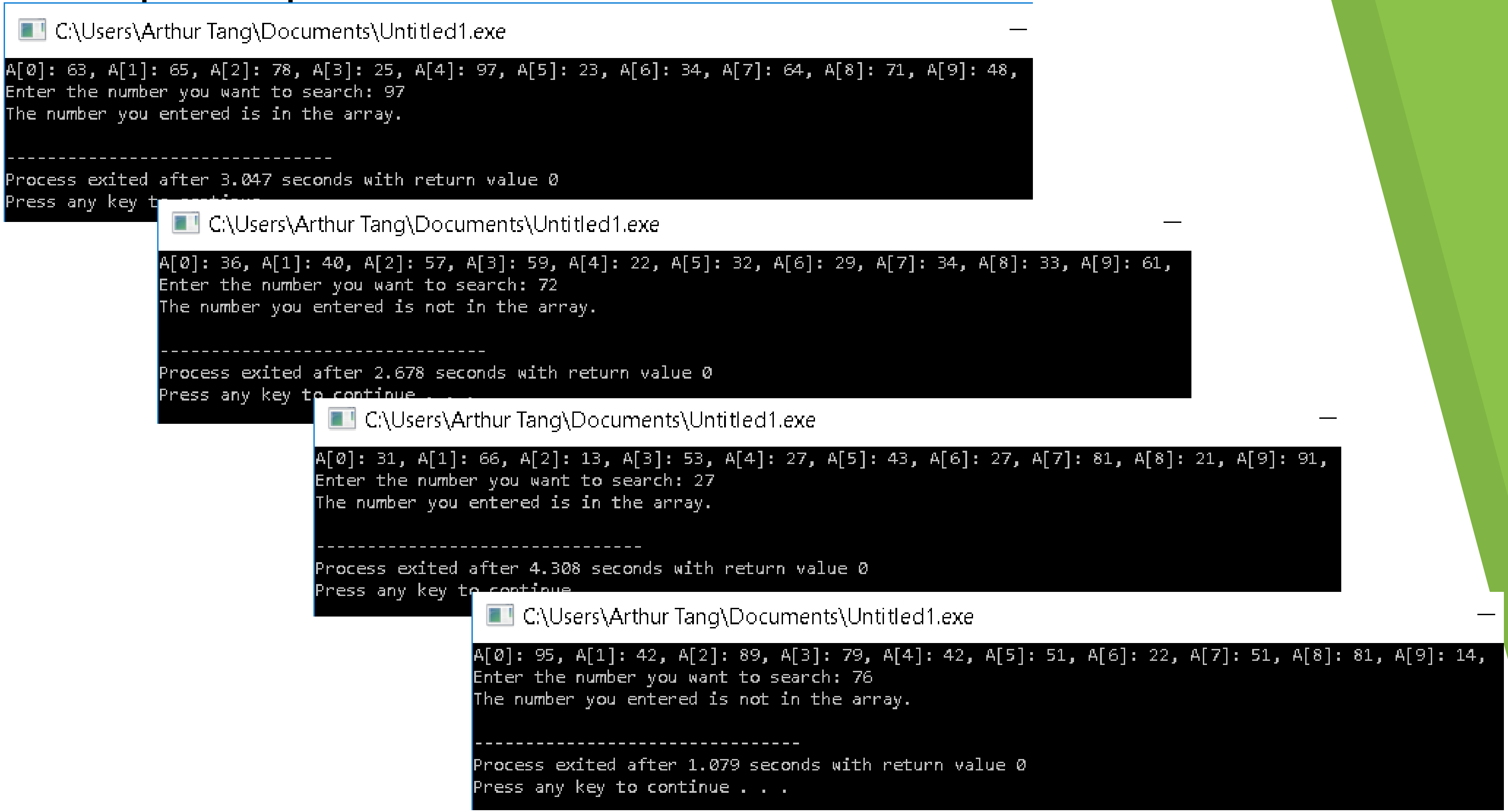
Submit your work before Wednesday 23:59 pm.

Assignment #7: Array

1. In the main function, create an one dimensional array consisting of 10 random integers in the range of 1-99.
2. Print out this one dimensional array.
3. Prompt the user to enter a number.
4. Write a **function** that would take (a) the number the user entered and (b) the array as **argument by reference**.
   - The array should be passed by reference in the function
   - Your function will search if the array contains the number the user entered
   - Your function will return the result (about if the array contains the number the user entered or not)
5. In the main function, print out the result.

Assignment #7: Pass by Reference

Sample outputs:



C:\Users\Arthur Tang\Documents\Untitled1.exe

```
A[0]: 63, A[1]: 65, A[2]: 78, A[3]: 25, A[4]: 97, A[5]: 23, A[6]: 34, A[7]: 64, A[8]: 71, A[9]: 48,
Enter the number you want to search: 97
The number you entered is in the array.

--------------------------------
Process exited after 3.047 seconds with return value 0
Press any key t
```

C:\Users\Arthur Tang\Documents\Untitled1.exe

```
A[0]: 36, A[1]: 40, A[2]: 57, A[3]: 59, A[4]: 22, A[5]: 32, A[6]: 29, A[7]: 34, A[8]: 33, A[9]: 61,
Enter the number you want to search: 72
The number you entered is not in the array.

--------------------------------
Process exited after 2.678 seconds with return value 0
Press any key to continue
```

C:\Users\Arthur Tang\Documents\Untitled1.exe

```
A[0]: 31, A[1]: 66, A[2]: 13, A[3]: 53, A[4]: 27, A[5]: 43, A[6]: 27, A[7]: 81, A[8]: 21, A[9]: 91,
Enter the number you want to search: 27
The number you entered is in the array.

--------------------------------
Process exited after 4.308 seconds with return value 0
Press any key to continue
```

C:\Users\Arthur Tang\Documents\Untitled1.exe

```
A[0]: 95, A[1]: 42, A[2]: 89, A[3]: 79, A[4]: 42, A[5]: 51, A[6]: 22, A[7]: 51, A[8]: 81, A[9]: 14,
Enter the number you want to search: 76
The number you entered is not in the array.

--------------------------------
Process exited after 1.079 seconds with return value 0
Press any key to continue . . .
```

Assignment #7: Function

Submit your source code on iCampus before Tuesday 11:59 pm