

Practice Exam – Getting Started (100 points)

Name:

Email Address:

1. (25 points) Problem Solving

a. Write an algorithm to balance a checkbook:

1. Welcome the user
2. Get the starting bank account balance from the user
3. Ask them if they're making a deposit or a withdrawal
4. If it's a deposit:
 - a. Ask the user amount they are depositing, echo it back, and check to see if they made a mistake.
 - b. Add the amount to their balance
 - c. Print out their new balance
5. If it's a withdrawal:
 - a. Ask the user amount they are withdrawing, echo it back, and check to see if they made a mistake.
 - b. Subtract the amount to their balance
 - c. Print out their new balance
6. Ask them if they have any more transactions. If so, go back to Step 3.
7. If there are no more transactions, thank them for running the program.

b. If you were to write a program to balance a checkbook, think about what C++ constructs would be useful for such a program. List three C++ constructs that could be used for such a program and explain how they would be used

To write this program you might need:

1. If/else if constructs to figure out if they are depositing or withdrawing money
2. Perhaps a while loop to see if the data they entered was correct or not
3. A do while loop to repeat the program until there are no further transactions to process.

2. (25 points) Style and Ethics

a. Given this program (without any style!) – please rewrite it with “style”

```
#include <iostream>  
using namespace std;  
int main() {int a=0;int b; cin>>b; if (b<=0)cout <<"Done";a=a+b;  
return 0; }
```

```
#include <iostream>  
using namespace std;  
/* *****  
Header  
***** */  
int main()  
{  
    int a = 0;  
    int b = 0;  
    cin >> b;  
  
    if (b <= 0)  
        cout << "Done";  
    a = a + b; // Note that this code is not inside the if statement.  
    return 0;  
}
```

Now examine the original program. Think about how the user would run such a program – answer these questions:

b. What issues would the user encounter?

The program expects the user to enter something but doesn't prompt them! Also, it doesn't echo back what they entered. Also, it doesn't print out the sum so they user has no idea what happened. Finally, it should pause at the end.

c. What could you do to make it better?

I would ask them to enter 2 numbers: one for a and one for b. I would tell them that I'm going to add the numbers together and then print out the sum. I would also pause the program at the end.

3. (25 points) Getting Started with C++

Given the following variables, answer the following questions

```
int num1, num2;
```

a. Write a C++ statement to read in (input) two whole numbers (into num1 and num2)

```
cin>>num1 >> num2;
```

b. Write a C++ statement to now output both numbers

```
cout<< num1<<num2;
```

c. Write an if statement that is true if either num1 is positive or num2 is negative:

```
if ((num1 > 0) || (num2 < 0))
```

d. Write an if statement that is true if num1 is between 15 and 20:

```
if ((num1 >= 15) && (num1 <= 20))
```

e. Write an if statement that is true if both num1 and num2 are not less than two hundred:

```
if ((num1 >= 200) && (num2 >= 200)) OR  
if (!(num1 < 200) || (num2 < 200))
```

f. Write an if statement that is true if num1 is either 10, 20, or 30:

```
if ((num1==10) || (num1==20) || (num1==30))
```

Short Answer:

a. Which of these increments a variable by 1: (circle your choice)

variable + 1; ++variable; variable = variable*1; variable +=variable;

b. Which of the following increments a variable by 2: (circle your choice)

variable + 2; ++variable; variable = variable*2; variable +=2;

4. (25 points) Character data and Loops in C++

Given the following variables, answer the following questions
`char letter;`

g. Write a C++ statement to read in (input) a single character (into letter)

```
cin >> letter;
```

h. Write a C++ statement to now output the character

```
cout << letter;
```

i. Write an if statement that is true if the character is a Y or N

```
if (( letter == 'Y' ) || (letter == 'N' ))
```

j. Write an if statement that is true if the character is an upper or lower case Y

```
if ((letter == 'y' ) || (letter == 'Y' )) OR  
if (tolower(letter) == 'y' )
```

5. Write a **while** loop that finds the average of all of the whole numbers entered from the user, until a -1 is encountered (the -1 should not be included in the calculation of the average). ** if you can't find the average - then provide the sum total of all of the numbers ***

```
int main()  
{  
    //declare the variables  
    int number;  
    int numcount = 0;  
    int total = 0;  
    float average;  
  
    //Ask the user for information  
    cout << "Enter an many whole numbers as you wish one at a time.\n";  
    cout << " Enter a -1 to when you're done\n";  
    cout << " I will find the average of your numbers (excluding the -1)\n";  
    cout << "enter a number: "; //initialize the control variable  
    cin >> number;  
  
    //Add the numbers together  
    while (number != -1) //test the control variable. Valid number?  
    {  
        total = total + number; //add the numbers together  
        numcount = numcount + 1; //keep track of how many numbers they entered  
        cout << "enter a number: ";  
        cin >> number; //change the control variable  
    }  
    average = total/numcount; //find the average of the numbers  
  
    //print out the results and thank the user  
    cout << "Your average is " << average << endl;  
    cout << "Thanks for running me!\n";
```