

# Exam 1

CSI 201: Computer Science 1  
Fall 2017

Professors: Shaun Ramsey

- - Answers are orange.
- - Additional Explanation.
- - Further thoughts on grading

Question	Points	Score
1	20	
2	20	
3	20	
4	10	
5	10	
Total:	80	

CS  
FUTU!

I understand that this exam is closed books and closed notes and is to be completed without a calculator, phone, or other computer. I am **NOT** allowed to use any external resources to complete this exam. All of the work that I am submitting for this exam is mine. I have completed this exam in accordance with the Washington College Honor Code. I understand that images, video and sound may be taken and recorded during this exam. Remember to use good style and programming practice throughout.

Name: \_\_\_\_\_

Key!

Signature: \_\_\_\_\_

Section: \_\_\_\_\_

1. 20 points Write the output that each code snippet would produce. Leave it blank if there is no output. Each line of output is worth 2 points.

Code Snippet:	Console Output:
<pre>int a = 8; int b = 10; cout &lt;&lt; a / b &lt;&lt; endl; cout &lt;&lt; b % a &lt;&lt; endl;</pre>	<p>0 2</p> <p><math>8/10 \Rightarrow 0</math> <math>10\%8 \Rightarrow 1R2</math></p>
<pre>int x = 7; if (x &lt; 5 &amp;&amp; x &lt; 10) {     cout &lt;&lt; 5 &lt;&lt; endl; } if(x &lt; 5    x &lt; 10) {     cout &lt;&lt; 6 &lt;&lt; endl; }</pre>	<p>6</p> <p><math>7 &lt; 5</math> FALSE <math>7 &lt; 10</math> TRUE</p> <p><math>\overbrace{F \ \&amp;\&amp; \ T}^F</math> <math>\underbrace{F \    \ T}_T</math></p>
<pre>for (int i = 0; i &lt; 2; ++i) {     cout &lt;&lt; i + 2 &lt;&lt; endl; }</pre>	<p>— loop runs 2 times</p> <p>2 3</p> <p><math>\begin{array}{r l} i &amp; i+2 \\ \hline 0 &amp; 2 \\ 1 &amp; 3 \end{array}</math></p>
<pre>int k = 13; while (k &lt; 42) {     cout &lt;&lt; k &lt;&lt; endl;     k = k + 10; }</pre>	<p>13 23 33</p> <p><math>\begin{array}{r l} k &amp; \\ \hline 13 &amp; \\ 23 &amp; \\ 33 &amp; \\ 43 &amp; \end{array}</math></p>
<pre>int p = 42; if(p &lt; 77) {     cout &lt;&lt; p &lt;&lt; endl;     p = p + 10; } else if (p &gt; 10) {     p = p - 10;     cout &lt;&lt; p &lt;&lt; endl; }  if (p &lt; 60) {     cout &lt;&lt; p &lt;&lt; endl; }</pre>	<p>42 52</p> <p><math>\left\{ \begin{array}{l} p \text{ is } 42 \ \&amp; \ 42 &lt; 77 \\ \text{cout } p \text{ then} \\ p \text{ is } 10 \text{ more } \dots 52 \end{array} \right.</math></p> <p>only one or none of these can be true/run</p> <p>Separate if condition</p> <p><math>p \text{ is } 52 \ \&amp; \ 52 &lt; 60</math> cout p</p>

2. Concepts: answer a-d with 1-2 lines of code. answer e briefly.

- (a) 4 points Write a line of code to get a random number between 1 and 10.

```
int r = rand()%10+1;
```

- (b) 4 points Demonstrate how to declare a variable to represent the number of pages in a book. Initialize this variable to 150. Use good programming practice.

```
int num_pages = 150;
```

- (c) 4 points Fill in the following loop such that it runs 25 times and produces 25 lines of output.

```
for(int i = 0; i < 25 ; i++) {  
    cout << "i is now: " << i << endl;  
}
```

- (d) 4 points Complete this loop such that it guarantees the user input is between 0 and 24 (number of hours the user slept yesterday), inclusive.

```
int userInput;  
cin >> userInput;  
  
while(userInput < 0 || userInput > 24) {  
  
    cout << "Bad Input, try again: ";  
    cin >> userInput;  
}  
  
cout << "Input is now guaranteed to be from 0 to 24." << endl;
```

- (e) 4 points What is a compiler and why is it used?

Our compiler is a translator that translates our high level human readable source code into low level machine executable code. It is a translator!

3. 20 points Find four kinds of errors in the following code snippet. Identify each error that you found in the space below. Explicitly explain the error (describe what is missing or incorrect), don't simply write the code where the error exists (unless you're fixing it to point out the error instead of describing the error). There may be more than four errors, but you only need to find four. Do not include duplicate errors. Refer to lines using the given line numbers.

```

/* Code Snippet begins here */
1. // code to to determine if number is perfect square or not
2. // sqrt(num) evaluates to the square root of a number
3. int number;
4. cin >> number;

                                     //0.001 is intentional in the next line
5. int computed = sqrt(number) + 0.001 ; //get sqrt, then put in int
6. computed = computed*computed;      //square it
7. if ( computed != number ) {        //is this the same?
8.     cout << "number is not perfect square" << endl;
9.
10. else {
11.     cout << "number is not perfect square" << endl
12. }
/* Code Snippet ends here */

```

↑ one of these must not be right!

Error 1. Missing Semi-Colon Line #: 5

Error 2. Missing \* symbol (or computing computing)  
(is not a valid variable) Line #: 6

Error 3. Missing Quotation Line #: 8

Error 4. logical error, one of these sentences from  
line 8 or line 11 must be incorrect Line #: 11

4. 10 points Write code that reads in a string from the console. If the word is “nevermind”, program ends. Otherwise, the program will repeat some code until the user types “nevermind”. If the string is the word “together” then read in two integers, and report their sum to the console. Otherwise, if the string is the word “apart” then read in two integers, subtract the second from the first and report the result. Finally, read in a string from the console again. Repeat this process until the user enters “nevermind”

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

```
int main() {
    // Your code goes here
    string user;
    cin >> user;
    while (user != "nevermind") {
        if (user == "together") {
            int a, b;
            cin >> a >> b;
            cout << a + b << endl;
        }
        else if (user == "apart") {
            int a, b;
            cin >> a >> b;
            cout << a - b << endl;
        }
        cin >> user;
    }
}
```

```
// end of your code
return 0;
}
```

1. Read String from user
2. Repeat some code until seeing nevermind
3. If together
  - a. read two ints
  - b. output sum
4. If apart
  - a. read two ints
  - b. first minus second to output
5. Read string from user

5. 10 points Write code to read in two integers from the console. The first integer will represent the number of hours that someone has worked during the week. The second integer will represent their hourly wage. Allowed values for the first integer are from 0 to 40 inclusive. For values outside of this range, report an error to the console. Proper values for the second integer are over 5. For values outside of this range, report an error to the console. In all other cases, report to the console the value of the first integer times the second. This will represent the number of dollars that this person earns that week.

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

```
int main() {
    // Your code goes here
```

```
    int hours, wage;
    cin >> hours >> wage;
    if (hours < 0 || hours > 40) {
        cerr << "Too few or too many hours" << endl;
    }
```

```
    if (wage <= 5) {
        cerr << "Wages are way too low!" << endl;
    }
```

```
    if (hours >= 0 && hours <= 40 && wage > 5) {
        cout << hours * wage << endl;
    }
```

```
    // end of your code
    return 0;
```

```
}
```

- 1) Read in two integers
- 2) If first value isn't 0-40 then report an error
- 3) If second value is not over 5 then report an error
- 4) In all other cases, output first \* second.

Using else if here and using else here is a decent approximation of the prompt