**Looping Tasks**

Respond briefly to each of the following. Use complete sentences.

**SHORT ANSWER (worth 2 points each):**

1. Why should a program close a file when it's finished using it?

Leaving the file open results in a memory leak  
2. What is a file's read position? Where is the read position when a file is first opened for reading?

A file’s read position is where the program is currently stopped at reading within the file, before continuing, it is denoted by a ‘\n’ character in C++, the first read position starts before anything in the file.

**From ALGORITHM WORKBENCH (worth 2 points each):**

3. Convert the while loop to a do-while loop:

|  |  |
| --- | --- |
| int x = 1; while (x > 0) {   cout << "Enter a number: ";   cin >> x; } | int x = 1; do {   cout << "Enter a number: ";   cin >> x; } while (x > 0); |

4. Convert the do-while loop to a while loop:

|  |  |
| --- | --- |
| char sure;  do {   cout << "Are you sure you want to quit? (Y/N) ";    cin >> sure; } while (sure != 'Y' && sure != 'N'); | char sure;  while (sure != 'Y' && sure != 'N') {   cout << "Are you sure you want to quit? (Y/N) ";    cin >> sure; } |

5. Convert the while loop to a for loop:

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| --- | --- |
| int count = 0; while (count < 50) {   cout << "Count is " << count << endl;   count++; } | for (int count = 0; count < 50; count++) {   cout << "Count is " << count << endl; } |

6. Convert the for loop to a while loop:

|  |  |
| --- | --- |
| for (int x = 50; x > 0; x--) {   cout << x << " seconds to go.\n"; } | int x = 50;  while (x > 0;) {   cout << x << " seconds to go.\n";  x--; } |

**From ALGORITHM WORKBENCH (worth 3 points):**

7. Write code that does the following (does not have to be a complete program):

* Opens an output file with the filename: Numbers.txt
* Uses a loop to write the numbers 1 through 100 to the file
* Closes the file

**De-bug the following programs (worth 3 points each): You can copy and paste the code into your IDE to debug it then copy and paste the corrected code below. (Note: If you copy and paste this code, you will need to use search and replace to change all of the single and double quotation marks. Microsoft Word uses special characters for these and they will need to be changed to plain text quotation marks.)**

8. This program should add two numbers entered by the user.

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| --- | --- |
| #include <iostream>  using namespace std;  int main()  {  int num1, num2;  char again;    while (again == ‘y’ || again == ‘Y’)  cout << “Enter a number: “;  cin >> num1;  cout << “Enter another number: “;  cin >> num2;  cout << “Their sum is << (num1 + num2) << endl;  cout << “Do you want to do this again? “;  cin >> again;  return 0;  } | #include <iostream>  using namespace std;  int main()  {  int num1, num2;  char ‘again’;    while (again == ‘y’ || again == ‘Y’) {  cout << “Enter a number: “;  cin >> num1;  cout << “Enter another number: “;  cin >> num2;  cout << “Their sum is << (num1 + num2) << endl;  cout << “Do you want to do this again? “;  cin >> again; }  return 0;  } |

9. This program uses a loop to raise a number to a power.

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| --- | --- |
| #include <iostream>  using namespace std;  int main()  {  int num, bigNum, power, count;  cout << “Enter an integer: “;  cin >> num;  cout << “What power do you want it raised to? “;  cin >> power;  bigNum = num;  while (count++ < power);  bigNum \*= num;  cout << “The result is << bigNum << endl;  return 0;  } | #include <iostream>  using namespace std;  int main()  {  int num, bigNum, power, count;  cout << "Enter an integer: ";  cin >> num;  cout << "What power do you want it raised to? ";  cin >> power;  bigNum = num;  while (count++ < power) {  bigNum \*= num;  }  cout << "The result is: " << bigNum << endl;  return 0;  } |

10. This program averages a set of numbers

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| --- | --- |
| #include <iostream>  using namespace std;  int main()  {  int numCount, total;  double average;  cout << “How many numbers do you want to average? “;  cin >> numCount;  for (int count = 0; count < numCount; count++)  {  int num;  cout << “Enter a number: “;  cin >> num;  total += num;  count++;  }  average = total / numCount;  cout << “The average is << average << endl;  return 0;  } | #include <iostream>  using namespace std;  int main()  {  float numCount, total;  double average;  cout << "How many numbers do you want to average?";  cin >> numCount;  for (int count = 0; count < numCount; count++)  {  int num;  cout << "Enter a number: ";  cin >> num;  total += num;  }  average = (total / numCount);  cout << "The average is " << average << endl;  return 0;  } |

11. This program displays the sum of two numbers

|  |  |
| --- | --- |
| #include <iostream>  using namespace std;  int main()  {  int choice, num1, num2;  do  {  cout << “Enter a number: “;  cin >> num1;  cout << “Enter another number: “;  cin >> num2;  cout << “Their sum is “ << (num1 + num2) << endl;  cout << “Do you want to do this again?\n”;  cout << “1 = yes, 0 = no\n”;  cin >> choice;  } while (choice = 1)  return 0;  } | #include <iostream>  using namespace std;  int main()  {  int choice, num1, num2;  do  {  cout << "Enter a number: ";  cin >> num1;  cout << "Enter another number: ";  cin >> num2;  cout << "Their sum is " << (num1 + num2) << endl;  cout << "Do you want to do this again?\n";  cout << "1 = yes, 0 = no\n";  cin >> choice;  } while (choice == 1);  return 0;  } |

12. This program displays the sum of the numbers 1-100

|  |  |
| --- | --- |
| #include <iostream>  using namespace std;  int main()  {  int count = 1, total;  while (count <= 100)  total += count;  cout << “The sum of the numbers 1-100 is “;  cout << total << endl;  return 0:  } | #include <iostream>  using namespace std;  int main()  {  int total = 0, count = 1;  while (count <= 100) {  total++;  count++;}  cout << "The sum of the numbers 1-100 is " << total << endl;  return 0;  } |