

Course Code: CS118	Course Name: Programming Fundamentals
Instructor Name: M.Shahzad/Basit Ali / S. Zain / Atiya / Musawar / Nida	
Student Roll No:	Section No:

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question before answering it. There are **4 questions and 2 pages**.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- You are **not allowed to write** anything on the question paper (except your ID and group).
- **Do not write any header files in writing your solution.**

Time: 60 minutes.

Max Marks: 40 Points

**Q1.** Observe and try to understand the following programs. Write the output of the program after correction (if needed): **[10 mins, 10 points]**

<b>(i).</b> <pre>int main() {     int n;     for(n = 7; n!=0; n--)     printf("n = %d", n--);     return 0; }</pre>	<b>(ii).</b> <pre>main( ) {     int n = 5;     for(printf("20k"); n &gt; 0;     printf("\nFAST NUCES"), n++);     printf("\nHello world!", n-=7 ); }</pre>
<b>(iii).</b> <pre>int main() {     inti = 1, j = 1;     for(--i, j++ ; i&lt;10; i+=2, j--,     j++, i+=j)     {         printf("loop ");     }     return 0; }</pre>	<b>(iv).</b> <pre>int main () {     int a;     int b = 1000;     for( a = 1; a &lt; 6; a++, b-- )     {         for ( b = 1; b &lt;= a; b++, a /=         1000 ){             printf("* ",a,b);             a *= 1000;         }         printf("\t\n");     } }</pre>
<b>(v).</b> <pre>int main(){     char str[]="2020";      while(str+strlen(str))     printf("*");     return 0; }</pre>	

**Q2.** Write a C program that implements the given algorithm. The program would read the array from the user and length of array **M**. The program print the sorted array after applying the following algorithm. **[15 mins, 10 points]**

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1: for  $j = 2$  to  $A.length$  do
2:    $key = A[j]$ 
3:    $i = j - 1$ 
4:   while  $i > 0$  and  $A[i] > key$  do
5:      $A[i + 1] = A[i]$ 
6:      $i = i - 1$ 
7:   end while
8:    $A[i + 1] = key$ 
9: end for

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**Q3.** Ali and Hasan are two batsman and their coach wants to decide which is better in performance. He needs to judge this by calculating the average and standard deviation of the score of these both. One who has better average score is better run getter and the one who has better standard deviation is more consistent. Also calculate the median and mode of the scores of both and these should be printed on console. The formula for standard deviation is provided below. You need to design a C program which takes the score of these both from user and determines the result. **[15 mins, 10 points]**

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

$\sigma$  = population standard deviation

$N$  = the size of the population

$x_i$  = each value from the population

$\mu$  = the population mean

**Q4.** Design a recursive function with the prototype “**totalConsonants (char\* str, int size)**” in C that calculates the total number of consonants in the provided string. **[20 mins, 10 points]**

\*\*\*\*\* Best of Luck\*\*\*\*\*