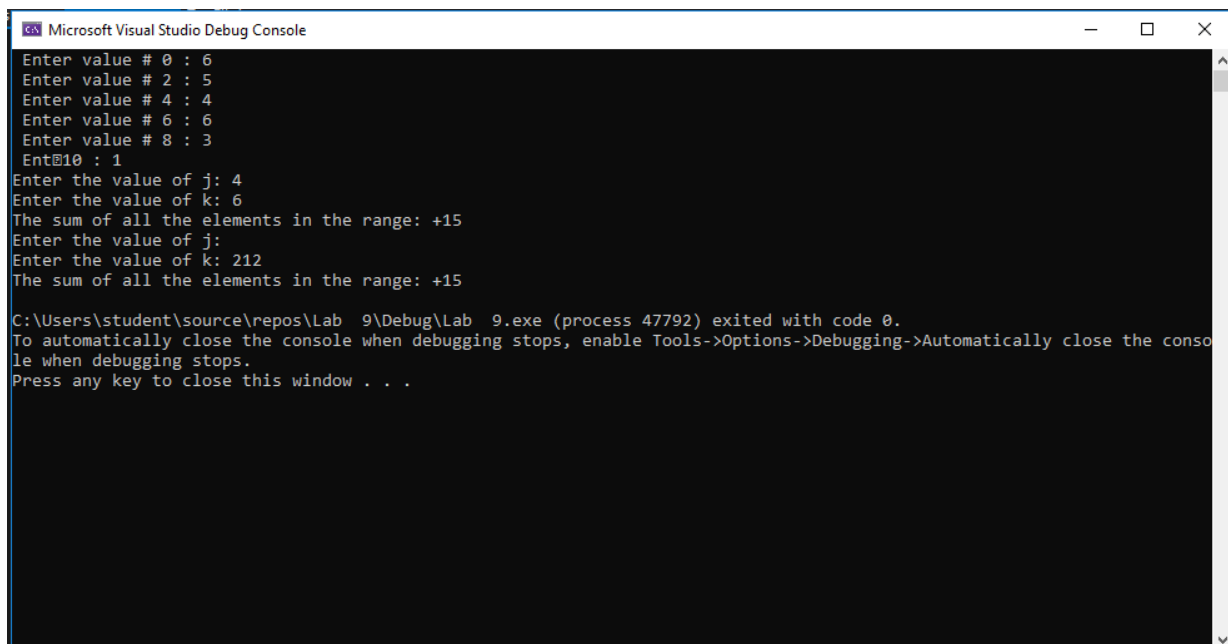# QUESTION # 1:

```
Include Irvine32.inc
Include Macros.inc
.data
arr SDWORD 6 DUP(?)
j SDWORD ?
k SDWORD ?
.code
  MAIN PROC
  mov ecx,LENGTHOF arr
  mov ebx,0
  getInput:mWrite " Enter value # "
mov eax,ebx
inc ebx
call WriteDec
mWrite " : "
call ReadInt
 mov [arr+ebx*4],eax
 inc ebx
 loop getInput
 call getJK
 push OFFSET arr
 push SIZEOF arr
 push j
 push k
 call arraySum
 call printResults
 call getJK
 push OFFSET arr
 push SIZEOF arr
 push j
 push k
 call arraySum
 call printResults
 exit
 MAIN ENDP

printResults PROC
mWrite "The sum of all the elements in the range: "
call WriteInt
call crlf
ret
printResults ENDP

getJK PROC
mWrite "Enter the value of j: "
call ReadInt
mov j,eax
mWrite "Enter the value of k: "
call ReadInt
mov k,eax
ret
getJK ENDP
```

```
arraySum PROC
;uses EBX ECX EDX ESI
local first:SDWORD,last:SDWORD,sizeArray:DWORD
mov esi,[ebp + 20]
mov eax,[ebp + 16]
mov sizeArray,eax
mov eax,[ebp + 12]
mov first,eax
mov eax,[ebp + 8]
mov last,eax
mov eax,0
mov edx,0
mov ecx,sizeArray
sumInRange:
mov ebx,[esi + edx * 4]
cmp ebx,first
jge checkIfWithinRange
jmp continueLoop
checkIfWithinRange:
cmp ebx,last
jle addIt
jmp continueLoop
addIt:
add eax,ebx
continueLoop:
inc ecx
sub ecx,4
inc edx
loop sumInRange
ret 16
arraySum ENDP
END MAIN
```
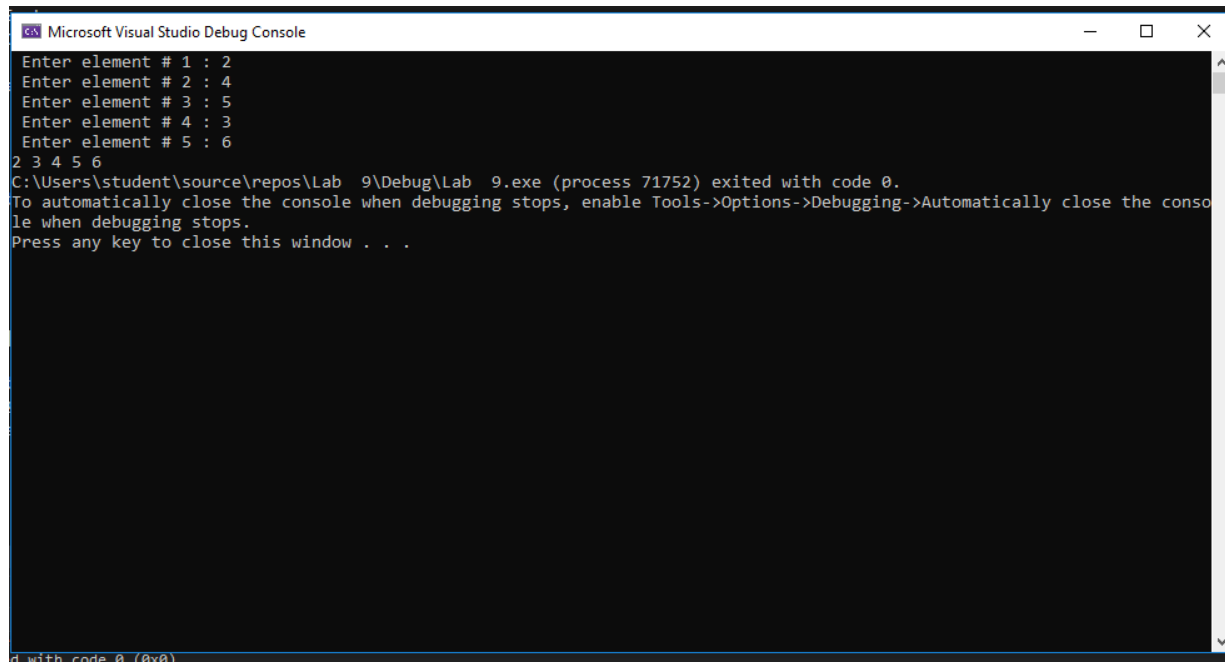


```
Enter value # 0 : 6
Enter value # 2 : 5
Enter value # 4 : 4
Enter value # 6 : 6
Enter value # 8 : 3
Ent 10 : 1
Enter the value of j: 4
Enter the value of k: 6
The sum of all the elements in the range: +15
Enter the value of j:
Enter the value of k: 212
The sum of all the elements in the range: +15

C:\Users\student\source\repos\Lab  9\Debug\Lab  9.exe (process 47792) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

QUESTION # 2:

```
Include Irvine32.inc
Include Macros.inc
.data
arr DWORD 5 DUP(?)
.code
  MAIN PROC
  mov ecx,LENGTHOF arr
  mov ebx,0
  getInput:
  mWrite " Enter element # "
  mov eax,ebx
  inc  eax
  call WriteDec
  mWrite " : "
  call ReadInt
  mov [arr+ebx*4],eax
  inc ebx
  loop getInput
  call selectionSort
  mov ecx,LENGTHOF arr
  mov ebx,0
  printSortedArray:
  mov eax,[arr + ebx * 4]
  call WriteDec
  mWrite " "
  inc ebx
 loop printSortedArray
 exit
MAIN ENDP
SWAP PROC
push ebp
mov ebp,esp
mov edx,[ebp + 8]
push edx
mov eax,[arr + edx * 4]
mov edx,[ebp + 12]
xchg eax,[arr + edx * 4]
pop edx
mov [arr + edx * 4],eax
pop ebp
ret 8
SWAP ENDP

selectionSort PROC
LOCAL largest:DWORD,i:DWORD,j:DWORD
mov ecx,LENGTHOF arr
mov largest,0
dec ecx
mov i,ecx
mov j,ecx
outerLoop:
mov ebx,i
```

```
mov largest,ebx
push ecx
mov edx,i
mov j,edx
innerLoop:
dec j
mov edx,j
mov eax,[arr + edx * 4]
mov edx,largest
mov ebx,[arr + edx * 4]
cmp eax,ebx
jg markNewMax
jmp continueLoop
markNewMax:
mov edx,j
mov largest,edx
continueLoop:
loop innerLoop
push i
push largest
call SWAP
pop ecx
dec i
loop outerLoop
ret
selectionSort ENDP
END MAIN
```

Microsoft Visual Studio Debug Console   —   □   ×
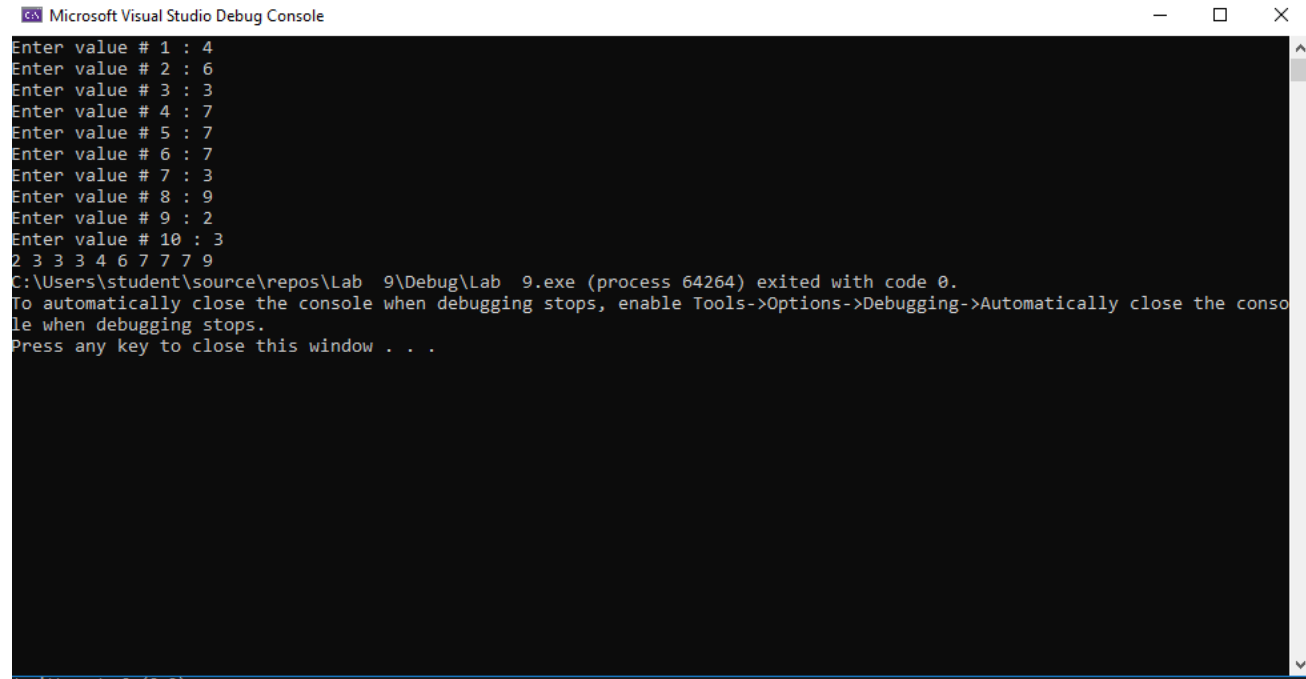
```
 Enter element # 1 : 2
 Enter element # 2 : 4
 Enter element # 3 : 5
 Enter element # 4 : 3
 Enter element # 5 : 6
2 3 4 5 6
C:\Users\student\source\repos\Lab  9\Debug\Lab  9.exe (process 71752) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

d with code 0 (0x0)

QUESTION # 3:

```
Include Irvine32.inc
Include Macros.inc
.data
arr BYTE 10 DUP(?)
.code
      MAIN PROC
      mov ecx,LENGTHOF arr
      mov ebx,0
      getInput:
      mWrite "Enter value # "
      mov eax,ebx
   inc eax
   call WriteDec
      mWrite " : "
      call ReadInt
      mov [arr + ebx],al
      inc ebx
   loop getInput
      mov esi,OFFSET arr
      mov ebx,LENGTHOF arr
      call bubbleSort
      mov ebx,0
      mov ecx,LENGTHOF arr
      printArray:
      mov al,[arr + ebx]
      call WriteDec
      inc ebx
      mWrite " "
      loop printArray
      exit
      MAIN ENDP
   bubbleSort PROC
      mov edi,esi
      mov ecx,ebx
      dec ecx
      mov ebx,0
      mov eax,0
      outerLoop:
      push ecx
      mov esi,edi
      innerLoop:
      mov al,[esi]
      mov bl,[esi+ 1]
      cmp al,bl
      jg swapElements
      continueLoop:
      inc esi
      loop innerLoop
      pop ecx
      loop outerLoop
```

```
        jmp endProgram
    swapElements:
        mov al,[esi]
        mov bl,[esi + 1]
        xchg al,bl
        mov [esi],al
        mov [esi + 1],bl
    jmp continueLoop
    endProgram:
    ret 8
    bubbleSort ENDP
    END MAIN
```
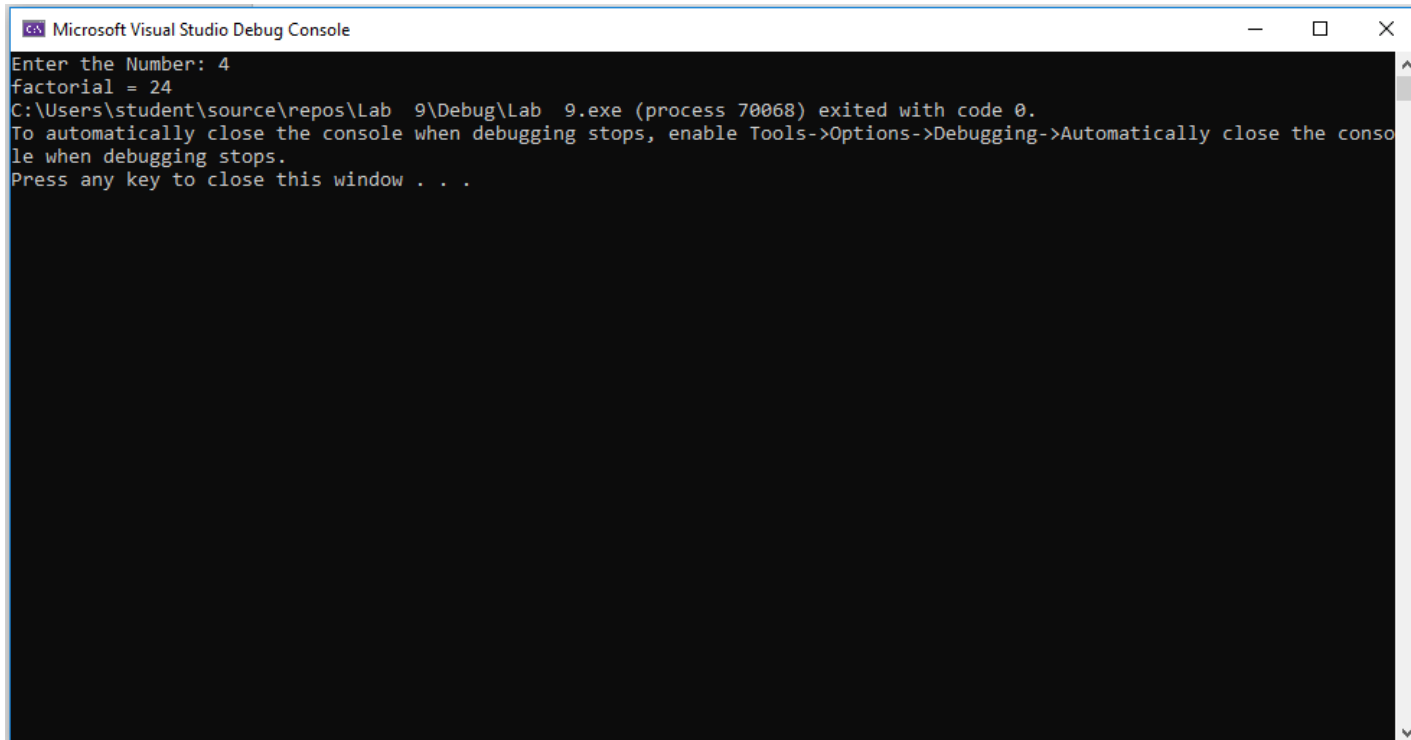
Microsoft Visual Studio Debug Console   —   □   ✕

```
Enter value # 1 : 4
Enter value # 2 : 6
Enter value # 3 : 3
Enter value # 4 : 7
Enter value # 5 : 7
Enter value # 6 : 7
Enter value # 7 : 3
Enter value # 8 : 9
Enter value # 9 : 2
Enter value # 10 : 3
2 3 3 3 4 6 7 7 7 9
C:\Users\student\source\repos\Lab  9\Debug\Lab  9.exe (process 64264) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

QUESTION # 4:

Muhammad Bilal Khan   20k1898   Assignment#2

```
Include Irvine32.inc
Include Macros.inc
.data
N DWORD ?
.code
MAIN PROC
mWrite "Enter the Number: "
call ReadInt
mov N,eax
call factorial
mWrite "factorial = "
call WriteDec
exit
MAIN ENDP
factorial PROC
mov eax,1
cmp N,0
jle endProgram
mov ecx,N
calculate:
mov edx,0
mul ecx
loop calculate
endProgram:
ret
factorial ENDP
END MAIN
```

Microsoft Visual Studio Debug Console   — □ ×

```
Enter the Number: 4
factorial = 24
C:\Users\student\source\repos\Lab  9\Debug\Lab  9.exe (process 70068) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```