 **Northwestern Polytechnic University**

**CE450L Lab - Embedded Engineering Lab**

**Lab Assignment #4**

**Due day: 10/13/2021**

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**Instruction:**

1. **Push the source code to GitHub or answer sheet in word file**
2. **Please follow the code style rule like programs on handout.**
3. **Overdue homework submission could not be accepted.**

**4. Takes academic honesty and integrity seriously (Zero Tolerance of Cheating & Plagiarism)**

**Objectives:**

This exercise is to write programs to solve some interesting questions by logic operation, loops and conditional statements

**The Laboratory Assignments:**

* **Requirements:** write programs for the following questions, and then post them in Github including program description in header block comments area.

1. **Swap two numbers without using third variable avoiding overflow issue**

#include<stdio.h>   
int main()   
{  
 int a=10, b=20;   
 printf("Before swapping a=%d b=%d",a,b);   
 a=a+b;   
 b=a-b;   
 a=a-b;   
 printf("\nAfter swapping a=%d b=%d",a,b);   
 return 0;   
}

**Output:**

Before swapping a=10 b=20

After swapping a=20 b=10

1. **Reverse a given number and print it on the monitor**

#include <stdio.h>  
int main()  
{  
 int n;

int reverse = 0;  
 printf("Enter a number to reverse: ");  
 scanf("%d", &n);   
 while(n > 0)

{  
 int r = n % 10;  
 reverse = reverse \* 10 + r;  
 n = n / 10;  
 }  
 n = reverse;  
 printf("Reversed number is %d\n", n);  
 return 0;  
 }

**Output:**

Enter a number to reverse: 456

Reversed number is 654

1. **Find greatest in 3 numbers from keyboard input**

#include <stdio.h>   
int main()  
{  
 int A, B, C;   
 printf("Enter values of A, B and C: ");  
 scanf("%d %d %d", &A, &B, &C);   
 if (A >= B && A >= C)  
 printf("A is the greatest.");   
 if (B >= A && B >= C)  
 printf("B is the greatest.");   
 if (C >= A && C >= B)  
 printf("C is the greatest.");   
 return 0;  
}

**Output:**

Enter values of A, B and C: 5 7 4

B is the greatest.

1. **Find that entered year is leap year or not**

[hint] In the Gregorian calendar three criteria must be taken into account to identify leap years:

- The year can be evenly divided by 4;

- If the year can be evenly divided by 100, it is NOT a leap year, unless;

- The year is also evenly divisible by 400. Then it is a leap year.

#include <stdio.h>

int main()

{

int y;

printf ("Enter a year :");

scanf ("%d",&y);

if (y%4 == 0) {

if(y%100 == 0) {

if(y%400 == 0)

printf("\n %d is a Leap Year.",y);

else

printf("\n %d is not a Leap Year.",y);

}

else {

printf ("\n %d is a Leap Year.",y);

}

}

else

printf("\n %d is not a Leap Year.",y);

return 0;

}

**Output:**

Enter a year :2020

2020 is a Leap Year.

1. **Find whether given number is even or odd from keyboard input**

#include<stdio.h>  
int main()  
{  
 int n;  
 printf("Enter any number: ");  
 scanf("%d", &n);  
 if(n%2 == 0)  
 printf("\n%d is an even number.", n);  
 else  
 printf("\n%d is an odd number.",n);  
 return 0;  
}

**Output:**

Enter any number: 45

45 is an odd number.

1. **Shift input data by three bits to the left**

#include<stdio.h>  
int main()  
{  
int x, y;  
printf("Read the integer from keyboard: ");  
scanf("%d",&x);  
x<<=3;  
y=x;  
printf("\nThe left shifted data is = %d ",y);  
return 0;  
}

**Output:**

Read the integer from keyboard: 2

The left shifted data is = 16

1. **Use switch statement to display Monday to Sunday**

#include<stdio.h>  
 int main()  
 {  
 char ch;  
 printf("Enter m for Monday \nt for Tuesday\nw for Wednesday\nh for Thursday\nf for Friday\ns for Saturday\nu for Sunday \n");  
 scanf("%c",&ch);  
 switch(ch)  
 {  
 case 'm':  
 case 'M':   
 printf("Monday \n");  
 break;  
 case 't':  
 case 'T':  
 printf("Tuesday \n");  
 break;  
 case 'w':  
 case 'W':  
 printf("Wednesday \n");  
 break;  
 case 'h':  
 case 'H':  
 printf("Thursday \n");  
 break;  
 case 'f':  
 case 'F':  
 printf("Friday \n");  
 break;  
 case 's':  
 case 'S':  
 printf("Saturday \n");  
 break;  
 case 'u':  
 case 'U':  
 printf("Sunday \n");  
 break;  
 default:   
 printf("Invalid Input \n");  
 break;  
 }  
 return 0;  
 }

**Output:**

Enter m for Monday

t for Tuesday

w for Wednesday

h for Thursday

f for Friday

s for Saturday

u for Sunday

f

Friday

1. **Display arithmetic operator using switch case.**

#include<stdio.h>

int main()

{

int a,b;

int op;

printf("Enter two Numbers: ");

scanf("%d %d",&a,&b);

printf(" Enter 1 for Addition \n 2 for Multiplication \n 3 for Subtraction \n 4 for Division:");

printf("\nEnter your Choice of operation: ");

scanf("%d",&op);

switch(op)

{

case 1 :

printf("Sum of %d and %d is : %d",a,b,a+b);

break;

case 2 :

printf("Difference of %d and %d is : %d",a,b,a-b);

break;

case 3 :

printf("Multiplication of %d and %d is : %d",a,b,a\*b);

break;

case 4 :

printf("Division of Two Numbers is %d : ",a/b);

break;

default :

printf(" Invalid Choice.");

break;

}

return 0;

}

**Output:**

Enter two Numbers: 8 4

Enter 1 for Addition

2 for Multiplication

3 for Subtraction

4 for Division:

Enter your Choice of operation: 1

Sum of 8 and 4 is : 12

1. **Input a number, such as n from keyboard and display their sum from 1 to n by using loops**

#include <stdio.h>

int main()

{

int i,n,sum=0;

printf("Enter a number : ");

scanf("%d",&n);

for(i=1;i<=n;i++)

{

sum+=i;

}

printf("\nThe Sum from 1 to %d is: %d \n",n,sum);

return 0;

}

**Output:**

Enter a number : 10

The Sum from 1 to 10 is: 55

1. **Print stars as following sequence on the monitor by loops**

#include<stdio.h>

int main()

{

int n;

printf("Enter a number : ");

scanf("%d", &n);

printf("\n");

for(int i = 1; i <= n; i++)

{

for(int j = 0; j <= n - i; j++)

{

printf(" ");

}

for(int k = 1; k <= i \* 2 - 1; k++)

{

printf(" \* ");

}

printf("\n");

}

for(int i = n+1; i >= 1; i--)

{

for(int j = n-i; j >= 0; j--)

{

printf(" ");

}

for(int k = i \* 2 - 1; k >= 1; k--)

{

printf(" \* ");

}

printf("\n");

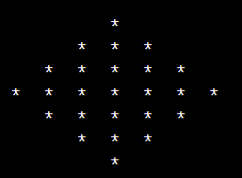
}

return 0;

}

**Output:**

Enter a number : 3

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