SINDH MADRESSATUL ISLAM UNIVERISTY, KARACHI

DEPARTMENT OF SOFTWARE ENGINEERING

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CSC103 - PROGRAMMING FUNDAMENTALS

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SECTION SE1A/SE1B/SE1C/CS1D[e]

LAB MANUAL 06

LOOP STRUCTURES IN C

LOOP STRUCTURES IN C

1. Loop:

- A loop statement allows you to execute a statement or block of statements repeatedly.

2. "for" loop:

```
for (variable initialization; condition; variable update)
{
        // statement
}
```

- Initialization expression is executed before execution of the loop starts. This is typically used to initialize a counter for the number of loop iterations. You can initialize a counter for the loop in this part.
- The execution of the loop continues until the loop condition becomes false.
- This expression is checked at the beginning of each iteration.
- The increment expression is usually used to increment/decrement the loop counter. This is executed at the end of each iteration

Example 01

```
#include <stdio.h>
int main()
{
    int max=5;
    int i=0;
    for (i=0; i<max; i++)
    {
        printf("%d\n",i);
    }
}
```

Example 02

```
// Program that print reverse counting from 10 to 1
// using for loop statement
#include <stdio.h>
int main()
{
    int j;
    for(j=10; j<=1; j++)
    {
        printf("Hello world");
    }
}
```

3. "while" Loop:

- The while loop is used when you want to execute a block of statements repeatedly, checking the condition before making an iteration.
- Here is syntax of while loop statement:

```
while (expression)
{
        // statements
}
```

- This loop executes as long as the given logical expression between parentheses is true.
- The expression is checked at the beginning of the loop, so if it is initially false, the loop statement block will not be executed at all.

Example 03

```
// using while loop statement
#include <stdio.h>
int main()
{
    int x = 10; int i = 0;
    while(i < x)
    {
    printf("%d\n",i);
    i++;
    }
}
```

Example 04

```c
// using while loop statement
#include <stdio.h>
int main()
{
    // while loop with a single statement
     int i = 0;
     while (i < 10)
          i++;
     printf("%d\n",i);
     // while loop with a compound statement
     int j = 2;
     while (j < 9) {
         printf("value of j %d\n",j);
         j = j+ 2;
     }
}

// what's wrong with i loop check by compiling it
```

Example 05

```c
// using while loop statement
#include<stdio.h>
int main(){
     int x=3,y=2;
     while(x+y-1){

          printf("%d ",x--+y);

     }
     return 0;
}
```

Example 06

```c
// using while loop statement
#include<stdio.h>
int main(){
    int x=2,y=2;
    while(x<=5,y<=3)
    {
        printf("%d\n",++x);
        printf("%d\n",++y);
    }
    return 0;
}
```

Task01: Convert the following algorithm into while loop C-scource code

```
Input:  num
(1) Initialize rev_num = 0
(2) Loop while num > 0
    (a) Multiply rev_num by 10 and add remainder of num
        divide by 10 to rev_num
            rev_num = rev_num*10 + num%10;
    (b) Divide num by 10
(3) Return rev_num
```

4. do-while Loop:

- do-while loop statement allows you to execute code block in loop body at least once. Here is do-while loop syntax:

```
do {
        // statements
    }
while (expression);
```

Example 07

```c
// using while loop statement
#include <stdio.h>
int main()
{
   int x;
   x = 0;
   do {
     /* "Hello, world!" is printed at least one time
        even though the condition is false */
        printf( "Hello, world!\n" );
   } while ( x != 0 );
}
```

Example 08

```c
// using do while  loop statement
#include <stdio.h>
int main()
{
    char a='A';
    do
    {
        printf("%c\n",a);
        a++;
    }while(a<'r');
}
```

Lab Task 06:

1. **The cashier at the counter of a Super Store, Mr. Khazaanchi has the following bundles of rupee cash notes with him: Rs. 1, 2, 5, 10, 50, 100, 500, and 1000. A customer comes at his counter with various items that he has shopped. Mr. Khazaanchi totals the item prices and tells the customer his total amount payable.**

- **The customer gives Mr.Khazanchi some amount of cash.**
- **Find the total number of Rs. notes of each denomination (i.e. 1,2,5,10,20,50,100,500,and 1000)**
- **Mr. Khazaanchi will have to give to the withdrawer ensuring that the total number of rupee notes are minimum**
    - **Sample Input: Total Bill 2534 Customer pays: 2600**
    - **Sample Output: Rs.1 Notes: 1**
      Rs.2 Notes:0
      Rs.5 Notes:1
      Rs.10 Notes:1
      Rs.50 Notes:1
      Rs.100 Notes:0
      Rs.500 Notes:0
      Rs.1000 Notes:0

2. **Running on a particular treadmill you burn 3.9 calories per minute. Write a program that uses a loop to display the number of calories burned after 10, 15, 20, 25, and 30 minutes.**

3. **Write a program that will read a float and a character. The character could be ‘d’ for deposit or 'w' for withdrawal. Starting with a balance of zero, add the deposits and subtract the withdrawals until the balance becomes negative. Then print by how much the balance went negative.**
    - **Sample Input:**

Enter Choice: 1) Add Deposit Press 'D' or ’d’ 2) Withdrawal Press 'w' or 'W'
User Enters: D
Enter Amount to Deposit: 100
Enter Choice: User Enters: D
Enter Amount to Deposit: 20
Enter Choice: User Enters: W
Enter Amount to Withdraw: 60
Enter Choice: User Enters: W
Enter Amount to Withdraw: 200

- **Sample Output: Your account now is -140.00 dollars**

Submission Instructions:

Due Date: Nov 17, 2022

1. **For C files, name your C files as questionNumber_yourRollNum_yourSection_LTNumber.c (e.g. Q1_BSE-22F-123_SE1A_LT1.c).**
2. **Place all files in a folder and name the folder as yourRollNum_yourSection_LTNumber (e.g. BSE-22F-123_SE1A_LT1).**
3. **Compress the folder by using either Winrar or 7Zip with the same name.**
4. **Go to tiny.cc/pffall2022smiu and in the "Coordination Document Folder" open the "PF-Activity Submission Form".**
5. **Fill out all the details with your correct password and submit the form by the due date.**