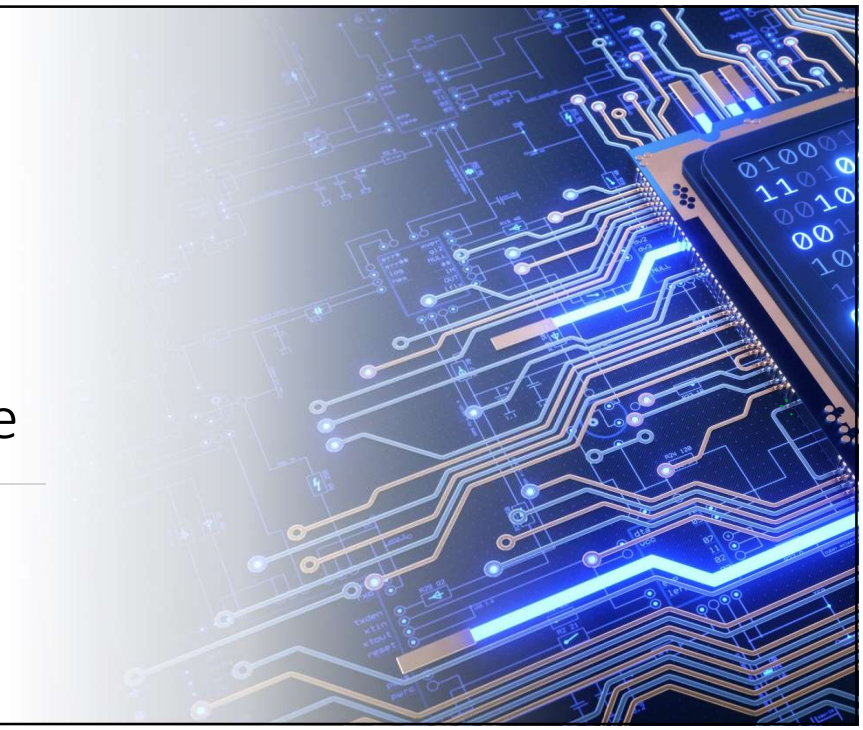

Chapter 5: Loop Structure

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Outline

Loop Control

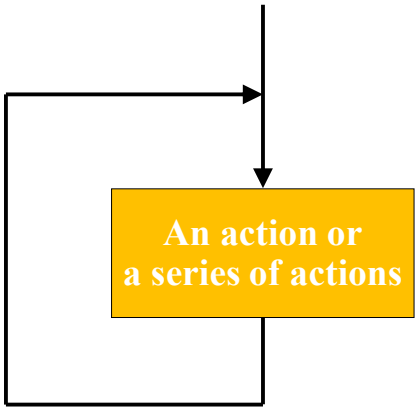
- Counter Control
- Event Control

Loop Statements in C

- while
- do... while
- for

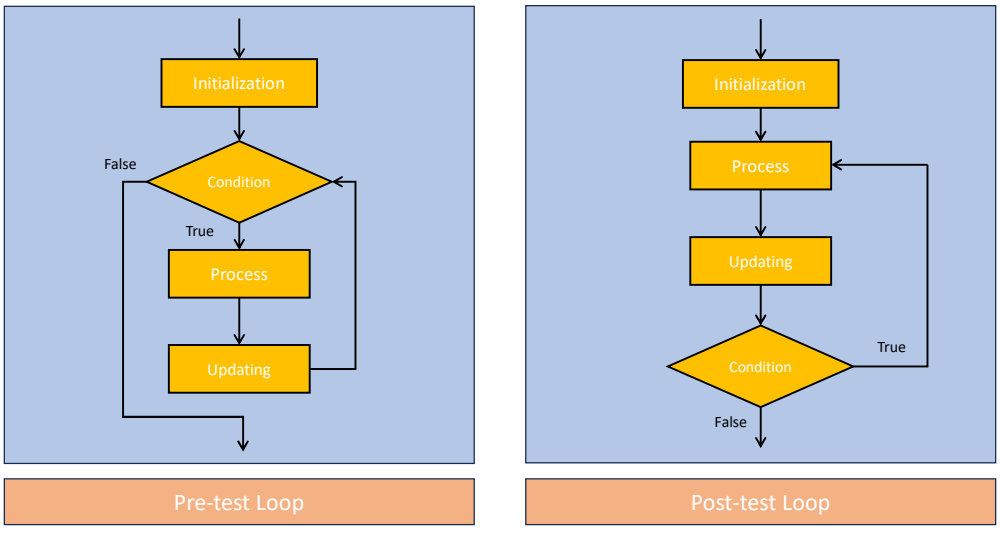
2

The Concept of Loop



3

Loop Control Variable



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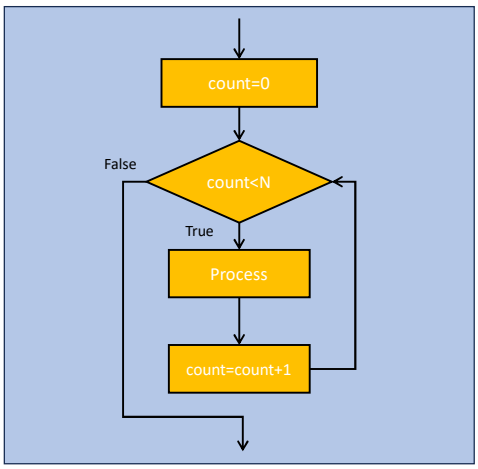
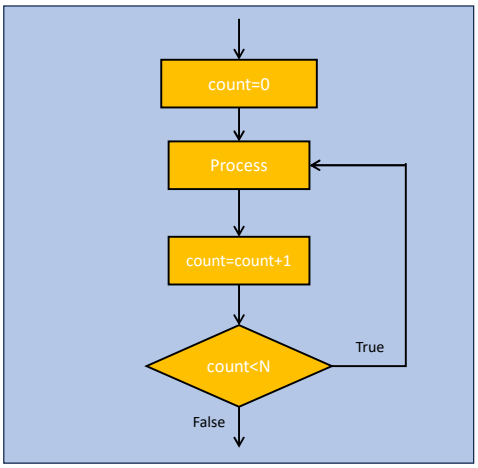
Counter Control



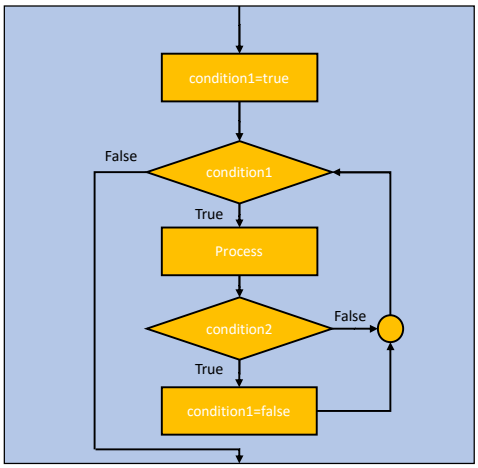
Pre-test Loop



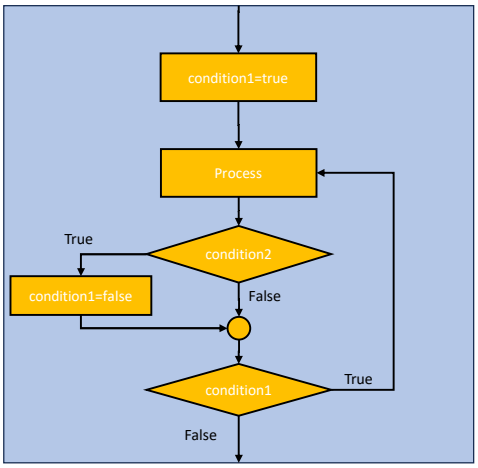
Post-test Loop

5

Event Control



Pre-test Loop



Post-test Loop

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Loop Statement in C

while	pre-test loop
do... while	post-test loop
for	pre-test loop

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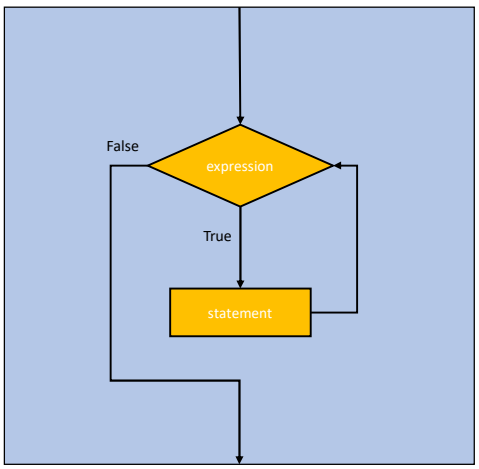
while

- Pre-test loop

```
while (expression)
{
   statement1;
   statement2;
   ...
   statementn;
}
```



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Example

```
#include<stdio.h>
int main()
{
    int i=1;
    int sum=0;
    while (i <= 10)
    {
        sum=sum+i;
        i++;
    }
    printf("%d", sum);
    return 0;
}
```

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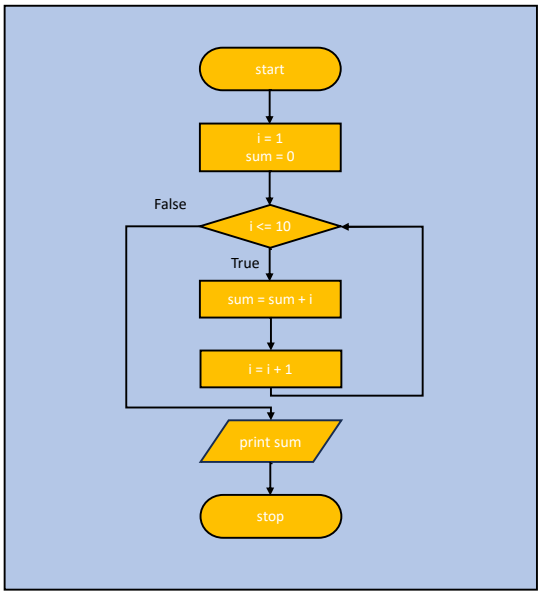

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Example

```
#include<stdio.h>
int main()
{
    int i=1;
    while (i <= 5)
    {
        printf("Hello %d\n", i);
        i++;
    }
    return 0;
}
```

```
Hello 1
Hello 2
Hello 3
Hello 4
Hello 5
```

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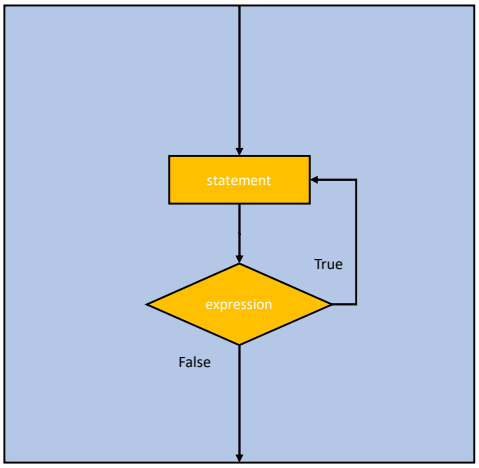
do... while

- Post-test loop

```
do {
   statement1;
   statement2;
   ...
   statementn;
} while (expression)
```



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Example

```
#include <stdio.h>
int main()
{
   int i=0;
   while (i<10)
   {
      i++;
      printf("%d ", i);
   }
   return 0;
}
```

```
1 2 3 4 5 6 7 8 9 10
```

```
#include <stdio.h>
int main()
{
   int i=0;
   do {
      i++;
      printf("%d ", i);
   } while (i<10);

   return 0;
}
```

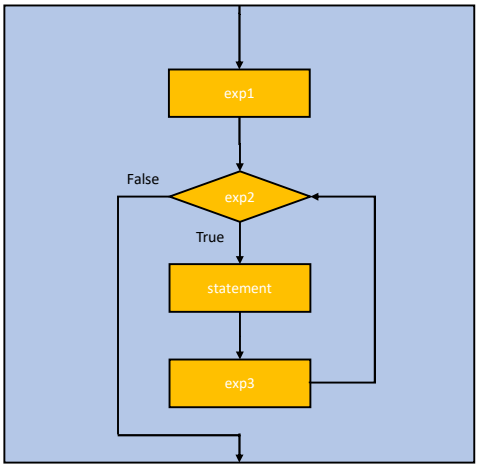
```
1 2 3 4 5 6 7 8 9 10
```

12

for

- Pre-test loop

```
for (exp1; exp2; exp3)
{
   statement1;
   statement2;
   ...
   statementn;
}
```



13

for VS while

```
i=1;

sum=0;

while (i<=10)
{
    sum = sum + i;
    i++;
}
```

Loop Initialize

Loop Condition

Loop Update

```
sum=0;

for (i=1; i<=10; i++)
{
    sum = sum + i;

}
```

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Example

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

```
5
4
3
2
1
```

15

Example – Counter Control

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

   printf("\nPlease enter a number: ");
   scanf("%d", &n);
   for (row = 1; row <= n; row++) // Repeat n times
   {
      for (col = 1; col <= n; col++) // Repeat n times
          printf("A");
      printf("\n");  // New Line
   }
   return 0;
}
```

```
Please enter a number: 4
AAAA
AAAA
AAAA
AAAA
```

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Example – Counter Control

```
#include<stdio.h>
int main()
{
   int row;
   int col1, col2;
   int n;

   printf("\nPlease enter a number: ");
   scanf("%d", &n);
   for (row = 1; row <= n; row++) // Repeat n times
   {
      for (col1 = 1; col1 <= n-row; col1++)
          printf(" ");
      for (col2 = 1; col2 <= row; col2++)
          printf("A");
      printf("\n");  // New Line
   }
   return 0;
}
```

```
Please enter a number: 4
   A
  AA
 AAA
AAAA
```

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Example – Event Control

```
#include<stdio.h>
#include<stdbool.h>
int main()
{
   bool stop = false;
   int number;

   while (!stop)
   {
      printf("\nPlease enter a number: ");
      scanf("%d", &number);
      if (number==0)
         stop=true;
   }
   printf("Program END.");
   return 0;
}
```

```
Please enter a number: 4
Please enter a number: 2
Please enter a number: 1
Please enter a number: 0
Program END.
```

18

while, do... while, and for?

while	• is most commonly used for event-controlled loops
do... while	• is most commonly used for event-controlled loops
for	• is most commonly used for counter-controlled loops

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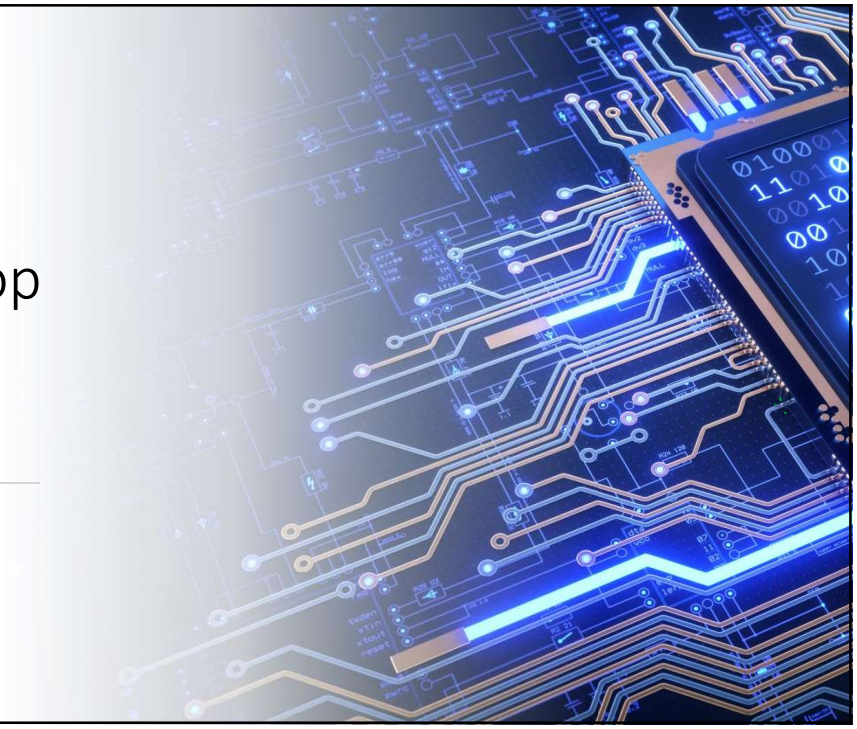
Chapter 5: Loop Structure - Completed



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