Introduction to Scientific and Engineering Computation (BIL 104E)

Lab 6

Controlling Program Flow: if

Using the if Statement in Decision Making

```
1:  /* 10L01.c  Using the if statement */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int i;
7:
8:     printf("Integers that can be divided by both 2 and 3\n");
9:     printf("(within the range of 0 to 100):\n");
10:    for (i=0; i<=100; i++){
11:       if ((i%2 == 0) && (i%3 == 0))
12:          printf("   %d\n", i);
13:   }
14:   return 0;
15: }
```

Controlling Program Flow: if

Computer Screen

```
Integers that can be divided by both 2 and 3
(within the range of 0 to 100):
   0
   6
   12
   18
   24
   30
   36
   42
   48
   54
   60
   66
   72
   78
   84
   90
   96
```

Controlling Program Flow: if - else

Using the if-else Statement

```
1:  /* 10L02.c  Using the if-else statement */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int i;
7:
8:     printf("Even Number   Odd Number\n");
9:     for (i=0; i<10; i++)
10:       if (i%2 == 0)
11:          printf("%d", i);
12:       else
13:          printf("%14d\n", i);
14:
15:    return 0;
16: }
```

Computer Screen

```
Even Number   Odd Number
0             1
2             3
4             5
6             7
8             9
```

Controlling Program Flow: Nested if

Using Nested `if` Statements

```
1:  /* 10L03.c  Using nested if statements */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int i;
7:
8:     for (i=-5; i<=5; i++){
9:        if (i > 0)
10:           if (i%2 == 0)
11:              printf("%d is an even number.\n", i);
12:           else
13:              printf("%d is an odd number.\n", i);
14:       else if (i == 0)
15:           printf("The number is zero.\n");
16:       else
17:           printf("Negative number: %d\n", i);
18:    }19:    return 0;
20: }
```

Controlling Program Flow: Nested if

Computer Screen

```
Negative number: -5
Negative number: -4
Negative number: -3
Negative number: -2
Negative number: -1
The number is zero.
1 is an odd number.
2 is an even number.
3 is an odd number.
4 is an even number.
5 is an odd number.
```

Controlling Program Flow: switch

Using the switch Statement

```
1:  /* 10L04.c  Using the switch statement */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int day;
7:
8:     printf("Please enter a single digit for a day\n");
9:     printf("(within the range of 1 to 3):\n");
10:    day = getchar();
11:    switch (day){
12:       case '1':
13:          printf("Day 1\n");
14:       case '2':
15:          printf("Day 2\n");
16:       case '3':
17:          printf("Day 3\n");
18:       default:
19:          ;
20:    }
21:    return 0;
22: }
```

```
Please enter a single digit for a day
(within the range of 1 to 3):
3
Day 3
```

```
(within the range of 1 to 3):
1
Day 1
Day 2
Day 3
```

Controlling Program Flow: break

Adding the break Statement

```
1:  /* 10L05.c  Adding the break statement */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int day;
7:
8:     printf("Please enter a single digit for a day\n");
9:     printf("(within the range of 1 to 7):\n");
10:    day = getchar();
11:    switch (day){
12:       case '1':
13:          printf("Day 1 is Sunday.\n");
14:          break;
15:       case '2':
16:          printf("Day 2 is Monday.\n");
17:          break;
18:       case '3':
19:          printf("Day 3 is Tuesday.\n");
```

Controlling Program Flow: break

```
20:            break;
21:         case '4':
22:            printf("Day 4 is Wednesday.\n");
23:            break;
24:         case '5':
25:            printf("Day 5 is Thursday.\n");
26:            break;
27:         case '6':
28:            printf("Day 6 is Friday.\n");
29:            break;
30:         case '7':
31:            printf("Day 7 is Saturday.\n");
32:            break;
33:         default:
34:            printf("The digit is not within the range of 1 to 7.\n");
35:            break;
36:     }
37:     return 0;
38: }
```

```
Please enter a single digit for a day
(within the range of 1 to 7):
1
Day 1 is Sunday.
```

Controlling Program Flow: Breaking an Infinite Loop

Breaking an Infinite Loop

```
1:  /* 10L06.c: Breaking an infinite loop */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int c;
7:
8:     printf("Enter a character:\n(enter x to exit)\n");
9:     while  {
10:       c = getc(stdin);
11:       if (c == 'x')
12:          break;
13:    }
14:    printf("Break the infinite while loop. Bye!\n");
15:    return 0;
16: }
```

```
Enter a character:
(enter x to exit)
H
I
x
Break the infinite while loop. Bye!
```

Controlling Program Flow: continue

Using the continue Statement

```
1:  /* 10L07.c: Using the continue statement */
2:  #include <stdio.h>
3:
4:  main()
5:  {
6:     int i, sum;
7:
8:     sum = 0;
9:     for (i=1; i<8; i++){
10:       if ((i==3) || (i==5))
11:          continue;
12:       sum += i;
13:    }
14:    printf("The sum of 1, 2, 4, 6, and 7 is: %d\n", sum);
15:    return 0;
16: }
```

```
The sum of 1, 2, 4, 6, and 7 is: 20
```