

Topics 2. C Basics (1).

Examples

Data Types, Operators, Decision and
Repetition Statements

COMP ENG 2SH4

Principles of Programming

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Example 1

- Read 10 integers input by the user and output their sum

```
# Python code
def main():
    sum = 0
    for i in range(10)
        x = input("Please input an integer: ")
        sum = sum + x
    print "The sum is", sum
```

```
# Python code
```

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

```
/* partial C code (1) */
```

```
#include <stdio.h>
```

```
int main(void)
```

```
{
```

```
    return 0;
```

```
}
```

```
# Python code
```

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

```
/* partial C code (2) */
```

```
#include <stdio.h>  
int main(void)  
{  
    // variables declarations  
    int sum;  
    int x;  
    // int sum, x;  
    return 0;  
}
```

```
# Python code
```

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

```
/* partial C code (3) */
```

```
#include <stdio.h>
```

```
int main(void)
```

```
{
```

```
    int sum, x;
```

```
    // initialize sum
```

```
    sum = 0;
```

```
    /* variables can be initialized when declared
```

```
    int sum=0, x; */
```

```
    return 0;
```

```
}
```

Python code

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

/* partial C code (4) */

```
#include <stdio.h>  
int main(void)  
{  
    int sum=0, x, i; // variable i is declared too  
    for(i=0; i<10; i++)  
    {  
        // the body of the loop goes here  
    }  
    return 0;  
}
```

Python code

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

/* partial C code (5) */

```
#include <stdio.h>  
int main(void)  
{  
    int sum=0, x, i;  
    for(i=0; i<10; i++)  
    {  
        printf("Please input an integer: ");  
        scanf("%d", &x);  
    }  
    return 0;  
}
```

```
# Python code
```

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

```
/* partial C code (6) */
```

```
#include <stdio.h>  
int main(void)  
{  
    int sum=0, x, i;  
    for(i=0; i<10; i++)  
    {  
        printf("Please input an integer: ");  
        scanf("%d", &x);  
        sum = sum + x; // sum += x;  
    }  
    return 0;  
}
```



```
# Python code
```

```
def main():  
    sum = 0  
    for i in range(10)  
        x = input("Please input an integer: ")  
        sum = sum + x  
    print "The sum is", sum
```

```
/* complete C code */
```

```
#include <stdio.h>  
int main(void)  
{  
    int sum=0, x, i;  
    for(i=0; i<10; i++)  
    {  
        printf("Please input an integer: ");  
        scanf("%d", &x);  
        sum = sum + x;    // sum += x;  
    }  
    printf("The sum is %d", sum);  
    return 0;  
}
```

Example 2

- Read 10 integers input by the user and output the **sum of the odd ones**
- Algorithm:
 - Initialize variable sum
 - Read integers one at a time and update sum only if the current integer is odd

Example 2

```
/* partial C code */
#include <stdio.h>
int main(void)
{
    int sum=0, x, i;
    for(i=0; i<10; i++)
    {
        printf("Please input an integer: ");
        scanf("%d", &x);
        /* if the integer is odd add it to sum;
           otherwise do nothing */

    }
    printf("The sum of odd integers is %d", sum);
    return 0;
}
```

Example 2

```
/* complete C code */
#include <stdio.h>
int main(void)
{
    int sum=0, x, i;
    for(i=0; i<10; i++)
    {
        printf("Please input an integer: ");
        scanf("%d", &x);
        if(x%2!=0)
        {
            sum = sum + x;
        }
    }
    printf("The sum of odd integers is %d", sum);
    return 0;
}
```

Example 3

- Read integers input by the user **until the first 1** and output their sum (the sum should not include the first 1)
- We **do not know** how many integers will be input
- We cannot use a counted loop
- Choose appropriately the loop continuation condition

Example 3. Algorithm

- Initialize sum to 0.
- Read the first integer in variable num
- While current number is not 1 (`while(num!=1)`)
 - Add it to sum
 - Read next integer
- After exiting the loop print sum

Example 3. C Code

// C code

```
#include <stdio.h>
```

```
int main(void){
```

```
    int num, sum=0;
```

```
    printf("Please input an integer (1 to quit)\n");
```

```
    scanf("%d",&num);
```

```
    while(num!=1){
```

```
        sum += num; //sum = sum + num;
```

```
        printf("Please input an integer (1 to quit)\n");
```

```
        scanf("%d",&num);
```

```
    }
```

```
    printf("The sum is %d", sum);
```

```
    return 0;
```

```
}
```