



岐阜工業高等専門学校

第 13 回課題

電子制御工学科: 情報処理 I

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1 はじめに

1.1 実行環境

この課題のプログラムは以下の環境で動作することが確認されている：

- OS: Arch Linux
- CPU アーキテクチャ: x86_64
- C コンパイラ: gcc バージョン 14.2.1 20250322 (GCC)
- C コンパイラオプション: -Wall

2 今回の構文

2.1 putchar 関数

putchar 関数は標準出力に引数で渡した文字 (または整数表現の文字コード) を書き込む関数である。引数は関数内部で unsigned char 型に変換される。[1]

putchar 関数

```
1 putchar('a'); // "a" が出力される
```

2.2 break・continue 文

break・continue 文はループ内で処理を中断・スキップする処理を記述する文である。goto 文とともに、濫用するとコードが読みにくくなるので注意が必要である。

break・continue 文

```
1 int i = 0;
2 while (i < 10) {
3     if (i % 3) {
4         continue;
5     }
6
7     if (i == 8) {
8         break;
9     }
10
11     printf("%d_", i++);
12 }
```

```
13
14 // 出力 : 0 1 2 4 5 7
```

3 演習 4-5

教科書の List 4-7 のスタートを 0 から 1 へ書き換えたプログラム。

3.1 コードリスティング

演習 4-5

```
1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      printf("Input positive integer: ");
7      scanf("%d", &n);
8
9      if (n <= 0) {
10         return 1;
11     }
12
13     int i = 1;
14
15     while (i <= n) {
16         printf("%d ", i++);
17     }
18     printf("\n");
19
20     return 0;
21 }
```

3.2 実行結果

```
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
    7 |     scanf("%d", &n);
      |     ~~~~~^~~~~~
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 10
1 2 3 4 5 6 7 8 9 10
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 5
1 2 3 4 5
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -10
information-processing-1_13th-class/programs/p45 on ʒ main [X!ʔ] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 3s
```

4 演習 4-6

入力した整数値以下の偶数を出力するプログラム。

4.1 コードリスティング

演習 4-6

```
1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      printf("Input positive integer: ");
7      scanf("%d", &n);
8
9      if (n <= 1) {
10         return 1;
11     }
12
13     int i = 1;
14
15     while (2*i <= n) {
16         printf("%d ", 2*i++);
17     }
18
19     printf("\n");
```

```
20
21     return 0;
22 }
```

4.2 実行結果

```
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
    7 |     scanf("%d", &n);
      |     ~~~~~^~~~~~
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 13
2 4 6 8 10 12
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 3s
> ./main
Input positive integer: 51
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -52
information-processing-1_13th-class/programs/p46 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> □
```

5 演習 4-7

入力した整数値以下の 2 のべき乗を出力するプログラム。

5.1 コードリスティング

演習 4-7

```
1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      printf("Input positive integer: ");
7      scanf("%d", &n);
8
9      if (n <= 1) {
10         return 1;
11     }
12
13     int i = 2;
14
15     while (i <= n) {
```

```
16     printf("%d", i);
17     i <= 1;
18 }
19
20 printf("\n");
21
22 return 0;
23 }
```

5.2 実行結果

```
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
   7 |     scanf("%d", &n);
     |     ~~~~~^~~~~
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 10
2 4 8
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: 100
2 4 8 16 32 64
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -532
information-processing-1_13th-class/programs/p47 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> □
```

6 演習 4-8

教科書の List 4-8 を 1 未満の時に改行を出力しないよにしたプログラム。

6.1 コードリスティング

演習 4-8

```
1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      printf("Input positive integer: ");
7      scanf("%d", &n);
8
9      if (n < 1) {
10         return 1;
11     }
```

```
11     }
12
13     while (n-- > 0) {
14         putchar('*');
15     }
16
17     putchar('\n');
18
19     return 0;
20 }
```

6.2 実行結果

```
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
    7 |     scanf("%d", &n);
      |     ^
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 10
*****
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 5s
> ./main
Input positive integer: 25
*****
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 3s
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -89
information-processing-1_13th-class/programs/p48 on 主 main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> □
```

7 演習 4-9

入力した整数値の個数分 + と - を交互に出力するプログラム。

7.1 コードリスティング

演習 4-9

```
1 #include <stdio.h>
2
3 int main(void) {
4     int n;
5
6     printf("Input positive integer: ");
7     scanf("%d", &n);
8 }
```



```
9     if (n <= 0) {
10         return 1;
11     }
12
13     int i = 0;
14
15     while (i < n) {
16         if (i % 2) {
17             putchar('-');
18         } else {
19             putchar('+');
20         }
21         i++;
22     }
23
24     putchar('\n');
25
26     return 0;
27 }
```

7.2 実行結果

```
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
   7 |     scanf("%d", &n);
     |     ~~~~~^~~~~~
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 4
+-+
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 3s
> ./main
Input positive integer: 9
+-+--+-+
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -54
information-processing-1_13th-class/programs/p49 on 主 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
^
```

8 演習 4-10

入力した整数値の個数分縦にアスタリスクを表示するプログラム。

8.1 コードリスティング

演習 4-10

```
1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      printf("Input positive integer: ");
7      scanf("%d", &n);
8
9      if (n < 1) {
10         return 1;
11     }
12
13     while (n-- > 0) {
14         putchar('*');
15         if (n != 0) {
16             putchar('\n');
17         }
18     }
19
20     return 0;
21 }
```

8.2 実行結果

```

information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:7:5: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
    7 |     scanf("%d", &n);
      |     ~~~~~^~~~~~
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 5
*
*
*
*
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 5s
> ./main
Input positive integer: 2
*
*
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: 1
*
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 0
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -64
information-processing-1_13th-class/programs/p410 on ㄿ main [X!?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
>

```

9 演習 4-11

教科書の List 4-10 の出力に入力値も表示するように変更したプログラム。

9.1 コードリスティング

演習 4-11

```

1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      do {
7          printf("Input positive integer: ");
8          scanf("%d", &n);
9          if (n <= 0) {
10             puts("\aPlease input non-negative, non-zero integer.");
11         }
12     } while (n <= 0);
13
14     printf("Reverse of %d is ", n);
15     while (n > 0) {
16         printf("%d", n % 10);

```

```

17     n /= 10;
18 }
19
20 puts(".");
21
22 return 0;
23 }

```

9.2 実行結果

```

information-processing-1_13th-class/programs/p411 on 1 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:8:9: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
    8 |         scanf("%d", &n);
      |         ^
information-processing-1_13th-class/programs/p411 on 1 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: -342
Please input non-negative, non-zero integer.
Input positive integer: 0
Please input non-negative, non-zero integer.
Input positive integer: 132
Reverse of 132 is 231.
information-processing-1_13th-class/programs/p411 on 1 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 8s
> ./main
Input positive integer: -879
Please input non-negative, non-zero integer.
Input positive integer: 3476778
Reverse of 3476778 is 8776743.
information-processing-1_13th-class/programs/p411 on 1 main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 10s
> 

```

10 演習 4-12

入力した正の整数値の桁数を表示するプログラム。

10.1 コードリスティング

演習 4-12

```

1  #include <stdio.h>
2
3  int main(void) {
4      int n;
5
6      do {
7          printf("Input positive integer: ");
8          scanf("%d", &n);
9          if (n <= 0) {
10             puts("\aPlease input non-negative, non-zero integer.");
11         }
12     } while (n <= 0);

```

```
13
14     int d = 0;
15     int x = n;
16     while (x > 0) {
17         x /= 10;
18         d++;
19     }
20
21     printf("%d is %d digit number.\n", n, d);
22
23     return 0;
24 }
```

10.2 実行結果

```
information-processing-1_13th-class/programs/p412 on ʘ main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> comp
main.c: 関数 'main' 内:
main.c:8:9: 警告: ignoring return value of 'scanf' declared with attribute 'warn_unused_result' [-Wunused-result]
      8 |         scanf("%d", &n);
        |         ^
information-processing-1_13th-class/programs/p412 on ʘ main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env)
> ./main
Input positive integer: 87935
87935 is 5 digit number.
information-processing-1_13th-class/programs/p412 on ʘ main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: 12
12 is 2 digit number.
information-processing-1_13th-class/programs/p412 on ʘ main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 2s
> ./main
Input positive integer: -879354
Please input non-negative, non-zero integer.
Input positive integer: 0
Please input non-negative, non-zero integer.
Input positive integer: 4098
4098 is 4 digit number.
information-processing-1_13th-class/programs/p412 on ʘ main [X1?] via C v14.2.1-gcc via * impure (LaTeX-Environment-env) took 10s
> ʘ
```

参考文献

[1]cppreference. *putchar*. URL: <https://en.cppreference.com/w/c/io/putchar> (visited on 07/10/2025).

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