

PE1 Worksheet

Problem solving

1) What are the four stages of problem solving by programming? What shall be done in each stage?

Stage 1:

Stage 2:

Stage 3:

Stage 4:

2) What is the top-down design strategy about?

3) What are the three control structures for writing an algorithm in pseudocode?

C Programming

1) Write the preprocessor directives for the following purposes:

To use input / output functions:

To use math functions:

To use "PI" in place of 3.14159:

2) What are the four common data types in C?

3) What are the criteria for valid variable/function names?

4) Give three examples of meaningful variable names.

5) Under what circumstances are single-letter variable names (e.g., i) acceptable?

6) Write a statement for declaring an integer variable *result* and initializing it to 0.

- 7) What are the format specifiers for the four common data types in `printf()`?
- 8) Write a statement for printing the message "Hello World!".
- 9) Write a statement for printing the value of a double variable *area* with two decimal places.
- 10) What are the format specifiers for the four common data types in `scanf()`?
- 11) Write a statement for reading in a value into a double variable *radius*.
- 12) What are the escape sequences for the following characters?
New line: Tab: Double quote: Percent:
- 13) What are the five common math operators in C and their associativity?
- 14) Which of the operators in 13) is not a basic arithmetic operation? How does it work? Give two examples in which this operator is useful.
- 15) What are the four increment/decrement operators in C and their associativity?
- 16) How are the two increment operators in 15) different? Give one example in which they lead to different results in computation.
- 17) What are the five assignment shorthand operators in C and their associativity?
- 18) Write an assignment statement using one of the assignment shorthand operators and rewrite it into another statement without using the shorthand.
- 19) List the operators in 13), 15) and 17), as well as the assignment operator "=" in ascending order of precedence.

20) Write an arithmetic expression (without variables) in which truncation occurs.

21) Rewrite the expression in 20) in two different ways to avoid the truncation.

With type-casting:

Without type-casting:

22) Assuming that an int variable *num* has been declared, write an assignment statement to assign a value to this variable in which truncation occurs.

23) Write down the math functions that you have used so far.

24) What are the four components of a function definition?

25) How to indicate the fact that a function does not return any value?

26) Given a function header (i.e., the first line of a function definition), how to convert it into a function prototype?

27) Where shall the function prototypes and definitions be written in a program?

28) What type of information should be written in the comments before a function definition?

29) Write a statement for calling the math function `pow()` to compute 2 to the power of 5 and assigning it to a variable *result*.

30) Write an if statement which increases the value of an int variable *result* by 1 if an int variable *value* is positive.

31) What should be added to the statement in 30) if *result* is to decrease by 1 when *value* is not positive?

32) What should be added to statement 30) to if *result* is to decrease by 1 when *value* is negative but to become 0 when *value* is 0.

33) When are the braces optional in if statements?

34) What are the six common relational operators in C and their associativity?

35) What are the three common logic operators in C and their associativity?

36) List the operators in 34) and 35) in ascending order of precedence.

37) List the operators in 19) and 36) in ascending order of precedence.

38) What are the representative values for true and false in C?

39) What values are considered true and what values are considered false in C?

40) Write two conditions (without using any variables) in which short-circuit evaluation occurs.

With AND operator:

With OR operator:

41) Write a switch statement which checks the value of an int variable *input*. If it is 1, increase an int variable *result* by 1. If it is 2, decrease *result* by 1. Otherwise, set *result* to 0.

42) What happens if the break statements in your code for 41) are omitted?

43) Write three loops of different types to calculate the sum of all the digits in a given integer *num*.

44) When is it more natural to use one particular type of loop than others?

for loop is more natural when

while loop is more natural when

do-while loop is more natural when

45) What is the effect of break in a loop?

46) What is the effect of continue in a loop?

Programming Environment

1) What are the vim shortcuts for the following purpose?

Enter insert mode		Delete 1 line	
Enter command mode		Delete n lines	
Quit		Copy 1 line	
Quit without saving		Copy n lines	
Save and quit		Paste	
Auto-indent		Copy & Paste	
Undo		Cut & Paste	
Redo			

2) What are the compiler options for the following purposes?

Issue all warnings		Use math functions	
Rename executable code			

3) Read the following compilation message and identify its components.

example1.c:19:18: error: 'Side1' undeclared (first use in this function)

Program name:

Line number:

Type (Error/Warning):

Reason: