

PE2 Worksheet

C Programming

- 1) Write a statement for declaring a pointer *ptr* for int variables.
- 2) Write an assignment statement which makes an int pointer *ptr* point to an int variable *value*.
- 3) Following 2), write an assignment statement which sets *value* to 0 through *ptr*.
- 4) Following 2), write a statement which increases *value* by 1 through *ptr* using increment operators.
- 5) List the operators in PE1 Worksheet 37) together with the "*" (indirection) and "&" (reference) operators in ascending order of precedence.
- 6) Write a statement for declaring an int array *arr* of size 50 and initializing all slots in it to be 0.
- 7) Given an array of size 50, what are the index numbers of its first and last slot?
- 8) Write a statement for assigning 100 to the first slot of an array *arr*.
- 9) Write a for loop for assigning 0 to all slots of an array *arr*.
- 10) Write a function for swapping slots *i* and *j* in an array *arr*.
- 11) Write a statement for calling the function in 10) to swap *arr[1]* and *arr[2]*.

12) Write a statement for declaring a 2D int array *arr* of size 3 * 3 and initializing the first slot of each row to 0 using a 2D array initializer.

13) Given the array *arr* in 12), what are the index numbers of the following slots?

First row, first slot:

Middle row, middle slot:

Last row, last slot:

14) Write a statement for assigning 100 to the middle slot of the middle row of the array *arr* in 12).

15) Write a for loop to check whether row *i* of the array *arr* in 12) are all 0s.

16) Write a for loop to check whether col *j* of the array *arr* in 12) are all 0s.

17) Write a for loop to check whether the diagonal of the array *arr* in 12) are all 0s.

18) Complete the following function definition such that the first parameter of the function is a 2D integer array called *arr* of N columns. This function should sum up the elements in *arr* up to row *r* and column *c*.

```
int sum2DArray(                , int r, int c){
```

```
}
```

19) Write a function prototype for the function in 18).

20) Complete the following function definition for computing the number of permutation and combination of choosing r items out of n . For example, the results are 6 (permutation) and 3 (combination) for $r = 2$ and $n = 3$. This function should return the two results via pointers.

```
void perm_and_comb(int r, int n,                ){
```

```
}
```

21) Write a function prototype for the function in 20).

22) Write a statement for calling the function in 20) with two inputs r and n and storing the outputs into two variables *perm* and *comb*.

23) Write a statement for declaring two file pointers, *infile* and *outfile*.

24) Write a statement for opening a file call "input.txt" for reading and storing the reference to the file pointer *infile*.

25) Write a code fragment for opening a file call "output.txt" for writing and storing the reference to the file pointer *outfile*. It should check whether the file can be opened. If not, it should print a message "Unable to open file." and exit with an error code 1.

26) What header file should be included for 25)?

27) Write a code fragment for reading in 10 integers from "input.txt" via *infile* and writing them to "output.txt" via *outfile*.

28) Write two statements for closing the two file pointers *infile* and *outfile*.

29) Describe the purpose of the following character functions:

`getchar()`:

`putchar()`:

`toupper(char ch)`:

`tolower(char ch)`:

30) Describe the purpose of the following character functions. In addition, give a few example values of *ch* for which the function would return 1 and 0 respectively.

`isalpha(char ch)`:

 returns 1 for:

 returns 0 for:

`isupper(char ch)`:

 returns 1 for:

 returns 0 for:

`isdigit(char ch)`:

 returns 1 for:

 returns 0 for:

`isalnum(char ch)`:

 returns 1 for:

 returns 0 for:

`isspace(char ch)`:

 returns 1 for:

 returns 0 for:

`ispunct(char ch)`:

 returns 1 for:

 returns 0 for:

31) What header file should be included to use the functions in 29) and 30)?

32) Write a statement for converting a digit character *c* into an integer (i.e., '0' → 0).

33) Write three code fragments for declaring a char array *str* and storing the string "egg" in it.

Using string constant:

Using array initializer:

Using assignment statements only:

34) What is the minimum size of *str* in 33) and what is the element at *str[3]* after storing the string "egg" in it?

35) Write two code fragments for reading in a string (which does not contain spaces and is at most 80 characters long) and storing it into a char array called *str* of size 81.

Using `scanf()`:

Using `fgets()`:

36) Write two code fragments for printing a string from a char array called *str*.

Using `printf()`:

Using `puts()`:

37) Write a statement for declaring a pointer and making it point to a string "egg".

38) Write a statement for computing the length of a string *str* using string functions.

39) Write a statement for checking whether two strings *str1* and *str2* are the same using string functions.

40) Write a statement for copying a string *word* into the start of a char array *sentence* using string functions.

41) Write a statement for finding the first occurrence of a string *word* in the string *sentence* using string functions.

42) Write a statement for converting a string *str* into an integer using string functions.

43) Write a statement for appending a string *word* into the string stored a char array *sentence* using string functions.

44) Write a statement for finding the first occurrence of a character *letter* in the string *sentence* using string functions.

45) Given a string *sentence* containing words separated by spaces, write a code fragment for printing the words in it on separate lines using string functions. For example, if the given string is "A fine day", the output should be "A", "fine" and "day" on separate lines.