

Family Name: Other Names:

Student ID: Signature

NWEN 241: Test 1

2022, September 15 ** WITH SOLUTIONS **

Instructions

- Time allowed: **30 minutes**
- Attempt **all** the questions. There are 40 marks in total.
- Write your answers in this exam paper and hand in all sheets.
- If you think some question is unclear, ask for clarification.
- You may use dictionaries.
- You may write notes and working on this paper, but make sure your answers are clear.

Hint: There might be more than one correct answer for each multiple choice question

Question 1. Select ALL valid C identifiers [2 marks]

- while
- record_100
- 2vars
- integer-counter
- CHAR

Question 2. Select ALL valid integer literals. [2 marks]

- 1234
- 0xbeer
- 100S
- 400UU
- 0234

Question 3. Select ALL valid floating point literals. [2 marks]

- 2.5d
- 3.14L
- 6.868e+23
- 8.676e
- 1.2*e-10

Question 4. What type does the expression 'A' * 32L / 16 - 2.5f evaluate to? [2 marks]

float

Question 5. Declare a symbolic constant named MACROCONST using macro. The constant should have a type float and value 1.381×10^{-23} [2 marks]

```
#define MACROCONST 1.381e-23f
```

Question 6. Declare a symbolic constant named ACONST using const. The constant should have a type double and value 6.022×10^{23} [2 marks]

```
const double ACONST = 6.022e+23;
```

Question 7. Consider the following function definition: [2 marks]

```
float func(char a, int b, float c)
{
    return a*b+c;
}
```

Write a statement to declare a function prototype of the function func.

```
float func(char, int, float);
or float func(char a, int b, float c);
```

Question 8. Write a single C statement to declare an array of integers named intarr which can hold 100 integers. [2 marks]

```
int intarr[100]
```

Question 9. Consider the following C code snippet:**[2 marks]**

```
float calculate_average ( float arr [ ], int arrlen )
{
    float sum;
    for( int i=0; i<arrlen; i++)
        sum += arr[i];
    return sum/arrlen;
}

int main(void)
{
    float fnums[ ] = {1,2,3,4,5,6,...}; // size can be arbitrary
    float ave;
    // call calculate_average () and assign return value to ave.
    return 0;
}
```

Write a single C statement to call the function `calculate_average()` and assign its return value to the variable `ave`.

```
ave = calculate_average(fnums, sizeof(fnums)/sizeof(float));
```

Question 10. Write a single C statement to declare a two-dimensional array of integers named `int2darr` which can hold 10 rows and 4 columns. Initialize the first row to have values of 3, 5, 0, and 1, respectively.

[2 marks]

```
int int2darr[10][4] = {{3,5,0,1}};
```

Question 11. Consider the following C code snippet:**[2 marks]**

```
char str1 [] = "String 1";
char *str2 = "String 2";
```

Select ALL valid statements involving `str1` and `str2`.

- `str1[0] = 's';`
- `str2[0] = 's';`
- `strcpy(str1, str2);`
- `strcpy(str2, str1);`
- `str2 = str1;`

Question 12. Consider the following statement:**[6 marks]**

```
char str1[ ] = "Hello\0world\n";  
char str2[30];  
strcpy(str2, str1);
```

(a) [2 marks] What is the size of the array str1 in bytes?

13

(b) [2 marks] What is the length of the string str1?

5

(c) [2 marks] What is the length of the string str2?

5

Question 13. Consider the following C code snippet:

[2 marks]

```
struct rec  
{  
    int a;  
    int b;  
    char c[10];  
};
```

Write C statements to declare a variable r of type struct rec. Initialize the members a to 6, b to 5 and c to "Hello".

```
struct rec r;  
r.a = 6;  
r.b=5  
strcpy(r.c, "Hello");
```

Question 14. Consider the following C snippet:

[2 marks]

```
int a[] = {1, 2, 3, 4, 5, 6, 7, 8};
```

```
int *p = a;
```

Select all expressions that will access the value of fifth element of the array a.

- a[4]
 *a+4
 p+4
 p[4]
 *(p+4)

Question 15. Consider the following C snippet:

[8 marks]

```
int a[ ] = {1, 2, 3, 4, 5};
int *ip = a;
```

Suppose that an int occupies 4 bytes. The address of array a is 500, while ip is at address 492 (all addresses are in decimal).

(a) [2 marks] What is the value of the expression a?

500

(b) [2 marks] What is the value of the expression ip+1?

504

(c) [2 marks] What is the value of the expression &a[2]?

508

(d) [2 marks] What is the value of the expression *(ip+1)?

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SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.