Fayoum University Faculty of Engineering		*Fundamentals of computer science*
Time: 2 hour	Final Term Exam	5-1-2017

Question 1 (18 points)

a) Complete the following statements:

1) The _____ finds syntax errors in the _____ file.

2) In a flowchart, the (input) statement is represented by _____ .

3) $(F04)_{16}$ = (_____$)_2$ = (_____$)_{10}$

4) What is the value of the expression $((x+5) \text{ != } 2) \,\|\, ((x+5) \text{ == } 2)$ && true _____

5) Making a decision between two alternatives is usually implemented with (a/an) _____ statement in C++.

6) Two hexadecimal digits can be stored in _____ byte/s.

7) The declaration of array with name checks, element type char and size 20 is _____ .

b) During the semester, each student was assigned for a group project and presentation. In the brief, write about the idea of your group project and your contribution in the group.

Question 2 (14 points)

What is the output when the following code fragment is executed?

a) the value of n= 5, 4, 10 and -5.
```
cin >> n; while (n > 0 && pow(2, n) < 1000)
{
cout << setw(2) << n << setw(8) << pow(2, n) << endl;
cin >> n;
}
```

b)
```
int m = 1;
while (m< 25) {
if(m%5!= 0 && m%3 == 0)
        cout << m << "x";
m++;    }
```

c)
```
int b = 22;
do {
b /= 3;
cout << b << "+";
} while (b > = 1);
```

d)
```
for(int i=1;i<=6;i++)
{
for(int j=1;j<=i;j++)
{if(i%2==1)
cout<<j;
else
cout<<"$";}
cout<<endl;
}
for(int z=6;z>=1;z--)
{
{for(int k=1;k<=z;k++)
if(z%2!=1)
cout<<"+";
else
cout<<k;}
cout<<endl;
}
```

Question 3 (12 points)
a) For the program segment below:
```
for (int i = 0; i < 9; i++)
{
for (int j = 0; j <= i; j++)
cout << setw(4) << (i * j);
cout << endl;
}
```
   a. How many times does the first cout statement execute?
   b. How many times does the second cout statement execute?
   c. What is the last value displayed?

b) Explain the difference between the statements on the left and the statements on the right below. For each of them, what is the final value of x if the initial value of x is 0?

```
if (x >= 0)                          if (x >= 0)
x = x + 1;                           x = x + 1;
else if (x >= 1)                     if (x >= 1)
x = x + 2;                           x = x + 2;
```

Question 5 (8 points)

An integer is said to be a **perfect** number if the sum of its factors, including 1 (but not the number itself), is equal to the number. For example, 6 is a perfect number, because 6 = 1 + 2 + 3. Write a full program that determines whether the number is a perfect number.

Question 6 (8 points)

Write a C++ program that declares and read an array **X** of **50** elements of the type *float*. Then

a. Print all elements with odd subscripts on one line.
b. Calculate the sum of the elements with odd subscripts only.

Good Luck
Dr. Menna Elbarawy

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