King Mongkut's University of Technology Thonburi
Midterm Examination 1/2016

Wednesday 21st September, 2016   13.00 -16.00

CPE100 Computer Programming for Engineers   Environmental Engineering Students

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Instructions

1. There are three parts: Total score is 60 points.
2. Write the answer in this exam sheet and write name and ID every page.
3. Calculators are not allowed to be used in the exam room.
4. Do not bring any documents out of the exam room.

Part 1 Please select the most correct answer then write down the answer in the answer sheet. (20 points)

Answer sheet for part 1.

1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10
1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20

1. What do you use to generate machine codes from C source codes?
   a. Assembler
   b. Interpreter
   c. Compiler
   d. All correct
   e. All wrong

2. Which of the datatypes is not supported by C language?
   a. byte
   b. int
   c. short int
   d. float
   e. all correct

3. what is the range of integer that a byte can store?
   a. 0 to 255
   b. -128 to 127
   c. -256 to 255
   d. Both a and b are correct
   e. All correct

4. Why do we have to put & in front of a variable when scanf()?
   a. Change to value
   b. Change to address
   c. Create a place holder for scanf()
   d. All correct
   e. All wrong

5. Which of the following statements are assignment statements?
   a. a++=a;
   b. a+=a;
   c. a=a++;
   d. a and b
   e. b and c

6. What is the datatype you can use with switch case?
   a. Floating point
   b. String
   c. Integer
   d. Both a and b
   e. All correct

7. If the result of printf("%d",3__1) is 1, what could be the operator in the blank?
    a. >>
    b. ||
    c. &
    d. All wrong
    e. All correct
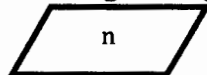
8. What is the text that can be written in side ⬭ ?
    a. Start/stop
    b. Begin/end
    c. Function name
    d. a and b
    e. all correct

9. Consider the given piece of C code, what it the datatype of number 5?

    float a;
    a = 5;

    a. int
    b. float
    c. double
    d. All wrong
    e. All correct

10. What is the meaning of the given flowchart symbol?

    a. Input n
    b. Output n
    c. Declare variable n
    d. All incorrect
    e. All correct

11. What is the possible C code generated from the following flowchart symbol?
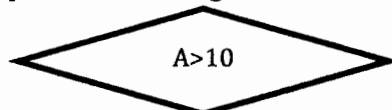
    a. if A>10
    b. while (A>10)
    c. else (A>10)
    d. switch (A>10)
    e. all correct

12. what is the output of the following C code?

```
int x,y,i;
for(i=0;i<5;i++){
        x=i++;   y=++i;
        printf("%d%d",x,y);
}
```

    a. 01234
    b. 0235
    c. 0246
    d. 1245
    e. 1345

13. what is the output of the following C code?

```
int n;
n=10;
n=!n>14;
printf("n=%d\n",n);
```

a. 10
b. 14
c. 0
d. 1
e. All wrong

14. What is the result of printf("%d",4/5*20)?

a. 0
b. 1
c. 0.04
d. 16
e. All wrong

15. What is the result from the following code?

```
A=75;
if (A > 100)    printf("Super\n");
else if (A > 80) printf ("Good\n");
else if (A > 60) printf ("Fair\n");
else if (A > 40) printf ("Poor\n");
else   (A<=40) print ("Fail\n");
```

a. Good
b. Fair
c. Poor
d. Fail
e. All wrong

16. What is the result of C code given below when A = 5 and B = 6?

```
if( ++A > B-- ) {
        printf("%d\n",A);
} else{
        printf("%d\n",B);
}
```

a. 4
b. 5
c. 6
d. 7
e. All wrong

17. What is the result of the C code given below when i=0 and j= 0?

```
if (i>1)
        if(j>1)  printf("First\n");
else  printf("Second\n");
```

a. No result on screen
b. First
c. Second
d. Syntax error
e. All wrong

18. What is the result of the C code given below?

```
int A = 1;
do {
        A+=2;
        printf("%d.", A);
} while (A < 11);
```

a. 1.2.3.4.5.6.7.8.9.10.
b. 1.3.5.7.9.
c. 2.4.6.8.10.
d. 3.5.7.9.11.
e. All wrong

19. What are lines with errors that compiler can detect in the following code?

```
1. float A;
2. for( A=1; A<5; A++)
3. {
4.        if(A%2==1);
5.                continue;
6.        printf("%d,", &A);
7. }
```

a. Line 1.
b. Line 2.
c. Line 4.
d. Line 6.
e. All 1, 2 4 and 6 will be detected

20. If all the syntax errors and warning are removed from the code in the code from problem 19, what is the result of the program?

a. 1,2,3,4,5
b. 1,2,3,4,
c. 1,3,
d. 2,4,
e. All wrong

Part 2 Please answer the following questions (25 points)

2.1 From a part of program on the left side of the table, when finishing the execution, find values of x, y and z (5 points)

Values before executions			Expressions	Results		
x	Y	z		x	y	z
1	5	3	x = z++ + ++y;	____	____	____
2	4	5	y = ++z + ++x;	____	____	____
1	2	4	z = (y=x+1) + (x=y+1);	____	____	____
4	1	2	z = (x = x+y) + (y = y+x);	____	____	____
5	3	7	z = x + (x=x+1) + (y=x+2);	____	____	____

2.2 Write down your answer in the provided space: there are some in C Expressions or normal mathematical formula equations (5 points)

$k = 9 + \dfrac{7f + \dfrac{s*e}{f}}{g - \dfrac{f+b}{y} + u}$	
	$a = pow((t+2*c/u)/((t+m-x)/(c-f)),3.0/5.0)+ (c+p/e-8) / (((4*t-g)/(t+v))+5);$
$w = \sqrt{\dfrac{o^4 + p}{z^2}} - \left(\dfrac{e}{f-g-k-d}\right)^{2/5}$	
	$y = (sin(e) - pow(acos(r),2.0/3.0)) / (asin(g) + pow(tan(h),4));$
$j = \dfrac{\dfrac{(\log_2 w)}{(\ln k)} - \dfrac{\sin^5(b)}{\cos(s^{1/3})}}{m - a}$	

2.3 Please fill in the table with one charactor for each box as the results shown on screen by the following variable definitions (5 points)

char A[10]= " KMUTT "; char B[8]= "MEx-1"; int D = 10; float E = D/4.0;

Commands	Printing Results																	
`printf("*Example*\n");`	*	E	x	a	m	p	l	e	*									
`printf("*%s*\n", A);`																		
`printf("%%%-3s%%\n", B);`																		
`printf("*%-12d*\n", D);`																		
`printf("*%-10f*\n", E);`																		
`printf("*%12.2f*\n", E);`																		
`printf("*%-8d*\n", E);`																		

2.4 Please answer the following questions in short detail. (10 points)

a. Please explain the difference between function **int main()** and function **void main()**

....

....

b. Please find Arithmetic Series, results from the following program.

```
void main ()
{   int  x = 0, i = 0 ;
    for ( i = -1; i <= 15;  i++) {
        if ( i % 2 == 0 )   x = x - ( 2 * i );
        else                x = x + ( 2 * i );
    }
}
```

....

....

c. Please explain the difference between 2 codes: one is in left side and another in right side.

int i=0;	int z=0;
for(i=0; i<20; i++)	for(z=0; z<20; ++z)
printf("%d",i);	printf("%d",z);

....

....

d. Please explain the difference between 2 codes: one is in left side and another in right side.

int i=0;
 	
do {   printf("%d",i++);
 	
   } while (i<20);
	int z=0;
	
	do { printf("%d", ++z);
	
	   } while (z<20);

....

....

e. Please explain the difference between = (an equal symbol) and == (two equal symbols)

....

....

f. Please explain the difference between & (an ampersand symbol) and && (two ampersand

   symbols)

....

....

g. A control statement ...   for(sum=0 ,i=0; i<10; sum += i, i++) ;

   when executed, what is the values of sum and i ?

....

....

h. Please explain a part called Preprocessor Directives, what is a part in this program?

....

....
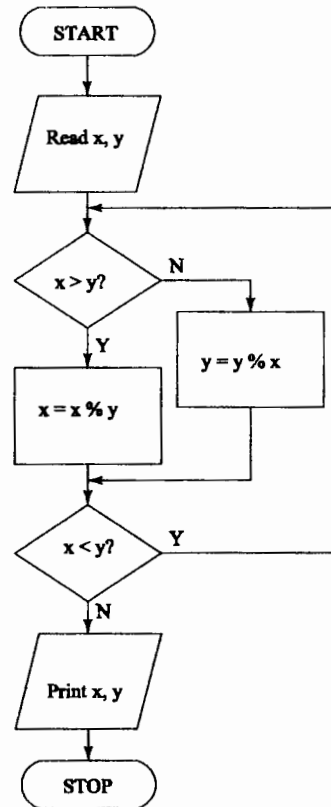
PART 3 Write the answer in the space provided.

3.1. Given the following flowchart, write a complete program in C.   [5 points]

```
                    ( START )
                        |
                        v
                   / Read x, y /
                        |
                        v
                   +---------+
      +----------->|  x > y? |---- N ----+
      |             \       /            |
      |              \     /             |
      |               Y                  v
      |               |             +---------+
      |               v             | y = y % x|
      |          +---------+        +---------+
      |          | x = x % y|            |
      |          +---------+            |
      |               |                 |
      |               v<----------------+
      |          +---------+
      |          |  x < y? |---- Y -----+
      |           \       /             |
      |            \     /              |
      +-------------------------------- +
                    | N
                    v
               / Print x, y /
                    |
                    v
                 ( STOP )
```

3.2. Given the following program: [5 points]

```
/************************************
 *  This program asks          *
 *   number of students,       *
 *   score of each student,    *
 *   and then compute and      *
 *   display average score     *
 ************************************/
#include<stdio.h>
int main
{
    int studentScore = 0,
        input = 0,
        numberOfStudents
        counter;
    float average = 0;
    do
    {
        printf("Please enter number of students: ");
        scanf("%d", numberOfStudents);
    }
    while(numberOfStudents < 1 || numberOfStudents > 100 )
    if(counter = 0; counter < numberOfStudents; counter++)
    {
        Printf("Please enter score for student %d: ", counter+1);
        scanf("%d, &input);
        if( input > 100 || < 0)
        {
            counter--;
            continue;
        studentScore += input;
    }
    average = (float) studentScore/numberOfStudents;
    printf("Average score for %d students is %lf", );
    return 0;
}
```

(a) **Circle** where errors are.

(b) Correct the errors and rewrite them in the box on the right.

3.3 Given the following program.   [5 points]

```c
int main()
{
  int n = 5;
  int i;

        while ( n > 0 )
        {
                for ( i=n;  i>0; i-- )
                {
                        if ( i % 2 == 1 ) break;
                        if ( n == 2 ) return 0;
                        printf("%d ",n);
                }
                printf("%d ",n);
                n=n-1;
        }
}
```

(a) Sketch a flow chart.

(b) Determine the output.

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