Eastern Mediterranean University
Department of Computer Engineering

CMPE 108 – Algorithms and Programming Midterm Exam, 2018-2019 Spring Semester

Apr 20, 2019

Duration: 100 minutes

Name, Surname: ..... Group : .....

Student No : ..... Signature :.....

Instructors **(Gr.1) İmren Toprak** **(Gr.2) Prof. Dr. Marifi Güler**
(Gr.4) Prof. Dr. Hasan Kömürcügil **(Gr.5) Selin Bitirim**

Instructions:

There are **5** questions in **7** pages including the cover page.
Calculators, mobile phones and any electronic devices are **NOT** allowed.
A table of operators for precedence and associativity is attached on Cover Page.
Passing any material including rubbers, pencils etc. to anybody else is strictly prohibited in the exam.
Asking questions to invigilators is prohibited. The instructors will visit the exam rooms regularly.

Q1 (15%)	Q2 (7.5%)	Q3 (24%)	Q4 (25%)	Q5 (28.5%)	Total

PRECEDENCE AND ASSOCIATIVITY TABLE

Operators	Associativity
( ) [ ] -> .	Left to right
! ++ -- + - * & (type)	Right to left (Unary)
* / %	Left to right
+ -	Left to right
< <= > >=	Left to right
== !=	Left to right
&&	Left to right
||	Left to right
?:	Right to left
= += -= *= /= %=	Right to left
,	Left to right

% specifiers in ANSI C:

%c char single character	%o int unsigned octal value
%d (%i) int signed integer	%p pointer address stored in pointer
%e (%E) float or double exponential format	%s array of char sequence of characters
%f float or double signed decimal	%u int unsigned decimal
%g (%G) float or double use %f or %e as required	%x (%X) int unsigned hex value

Q1) [15 pts] In the following questions, there are two types of questions: multiple choice and fill-in blank type. Circle the correct answer for multiple type questions and write down into the empty line for the fill-in blank type questions.

i) The smallest data item in a computer is called a.....**bit**.....

ii) A……**byte**……. is a unit of data that is commonly made up of eight binary digits.

iii) In a....**volatile**.....type of memory, data is lost when power is turned off.

iv) **Control unit**..... directs and monitors the overall operation of the computer.

v) An electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program is called a……**computer**……..

vi) Which component belongs to the central processing unit (CPU)? **(d)**

a) Keyboard, b) Monitor, c) Printer, d) Arithmetic logic unit (ALU)

vii) What does RAM stand for? **(c)**

a) Random Array Machine, b) Reduced Array Matrix, c) Random Access Memory

viii) The input/output unit provides: **(a)**

a) Access to the computer, b) Performs all computations, c) Issues signals needed by the computer

ix) Computer hardware includes: **(c)**

a) Computer case, monitor, keyboard, mouse, b) Hard disk drive, motherboard, video cart, speakers, c) All of them

x) A programming language is a set of: **(a)**

a) Commands, instructions, and other syntax used to create a software program.

b) Data such as byte, word, and double-word used to access a memory.

c) Memory units such as kilo byte (KB), mega byte (MB) and giga byte (GB).

Q2)

i) [4 pts] What value is assigned to x when y is 10.0?

a) (x=15.0)

```
x=25.0;
y=10.0;
if (y != (x-10.0))
    x=x-10.0;
else
    x=x/2.0;
```

b) (x=50.0)

```
x=25.0;
y=10.0;
if (y < 15.0 && y >= 0.0)
    x=5*y;
else
    x=2*y;
```

ii) [2 pts] Determine the output of the following C program segment **(x=50)**

```
x=5;
y=10;
if (y == (20-x))
    x=x-2;
else if (x == (y-3))
    y++;
else if (y == x)
    x--;
else
    x*=y;
```

Q3) a) [5 pts] State which of the following C identifier names are valid or invalid. Give reason if invalid.

Identifier	**Valid/Invalid**	**Reason**
3Switch	**invalid**	**Identifier cannot start with a number**
nUmber	**valid**	
_book_10	**valid**	
double	**invalid**	**Identifier cannot be a keyword**
dolar$	**invalid**	**Identifier cannot contain a special character**

b) [3 pts] Write the data types of each value.

Value	**Data Type**
4.724	**Double/float**
-16	**int**
'c'	**char**

c) [6 pts] Write down a C expression corresponding to each of the following mathematical expressions.
Do not use unnecessary parentheses. Write the answers into answer boxes.

a) $(3z - 2y + 4)^2$ **(3*z-2*y+4)* (3*z-2*y+4)**

b) $s = y + \frac{2e}{c+d}$ **y+((2*e)/(c+d))**

d) [10 pts] For the following display outputs fill in the blanks of the printf statements to get the output exacly as given below.

a) printf("%-3d%3d%-3d",3,3,3);

3					3	3												

b) printf("%.4e", 987.6513);

9	.	8	7	6	5	e	+	0	2									

c) printf("%6.2f", 96.85957);

	9	6	.	8	6													

d) printf("%.3f%c%.3e",34.56, '+' ,-456);

3	4	.	5	6	0	+	-	4	.	5	6	5	e	+	0	2	

e) printf("%2d%c%2d",4,'+',4);

	4	+		4														

Q4) a) [20 pts] Draw the flowchart of the following algorithm.

1. BEGIN
2. Sum = 0
3. N = 20
4. i = 1
5. WHILE (i < N)

    IF (i % 2 != 0)

    Sum = Sum + i

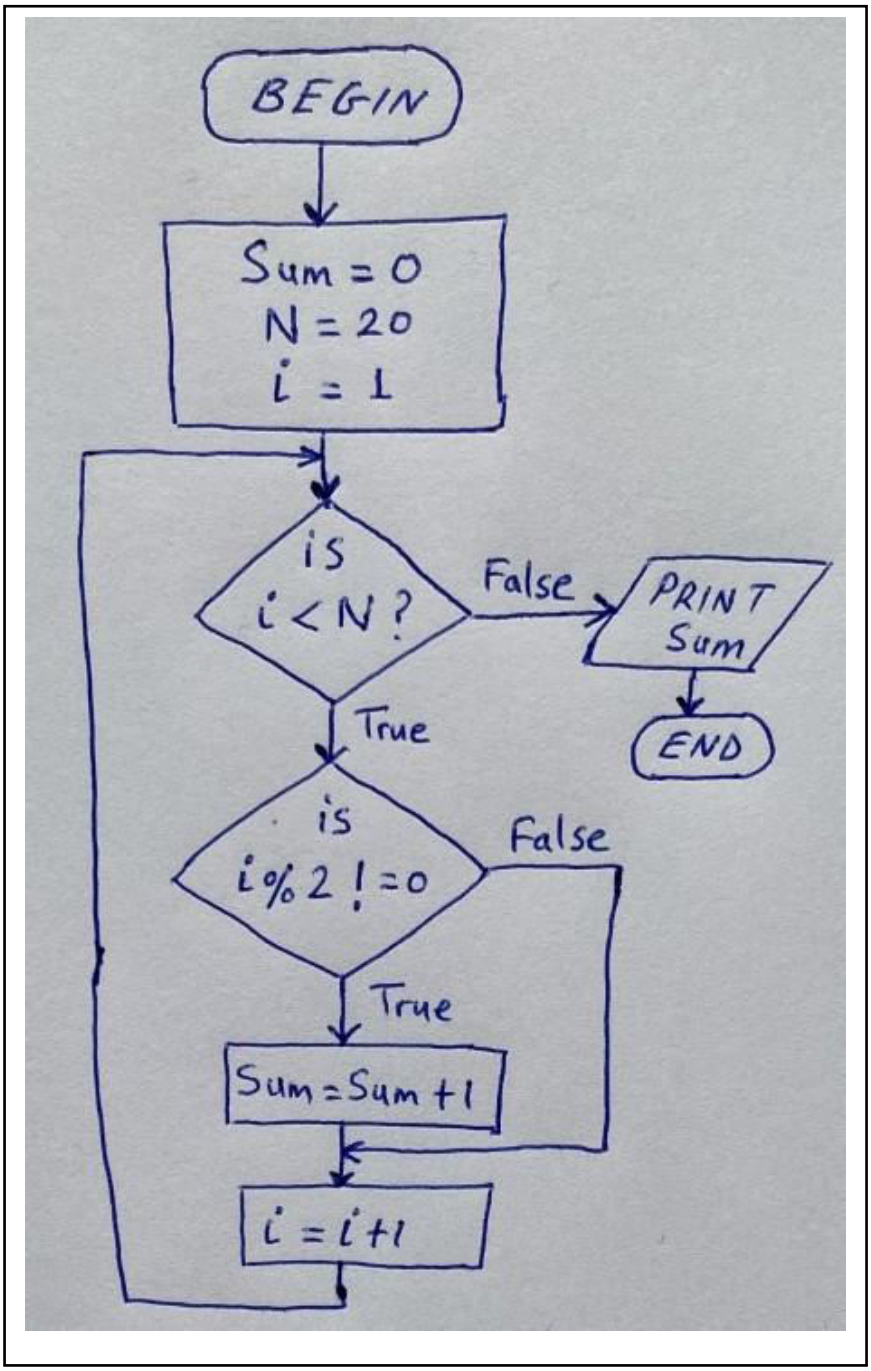
    i = i + 1

    ENDIF

  END_WHILE

6. PRINT Sum

Flowchart:



b) [5 pts] Trace and find the output of the algorithm.

Output:

100

Q5) a) [16.5 pts] Give the outputs of the following two code fragments.

```
int i;
printf("Enter a value for i >");
scanf("%d", &i);
switch(i)
{
 case 4: i=i+3;
 case 3:
 case 1: i=i+1;
 case 6: break;
 case 7: i=i+2;
        break;
 case 8: i=i+2;
 default : i=i+1;
}
printf("%d\n",i);
}
```

input	output
6	6
4	8
2	3
7	9
3	4
8	11

```
int x;
printf("Enter a value for x >");
scanf("%d",&x);
if(x > 5)
{  if(x < 10)
 {  if(x>=8) printf("DD");
   else printf("EE");
 }
 else
 {
   if ( x – 14 >= 0)
      printf("BB");
   else printf("AA");
 }
}
else
printf("CC");
```

input	output
3	CC
7	EE
9	DD
12	AA
16	BB

b) [12 pts] Assuming that

double y = 1.0, z = 2.0;

int a = 0, b = 1, c = 0, w = 1, x = 2;

is given before each expression below, give the values of expressions in the corresponding boxes.

#	expression	value
1	x / w * x - w	**3**
2	y / z / y / z	**0.25**
3	x > 1	**1**
4	w == 2	**0**
5	x < 9 && (x > 1)	**1**
6	z + 5.1 >= 6.5 || x != y	**1**
7	w <= x != y <= z	**0**
8	!!x	**1**
9	b + a==c	**0**
10	-5 < b - 2 < 0	**0**
11	--a	**-1**
12	c--	**0**