

# Answers for the Examination Papers

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# 1 2015 Mid-Term

## 1.1 Remarks

### 1.1.1 Question 48-50

In Question 48, Question 49 and Question 50, the number is in 4-bit unsigned integer format.

## 1.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	A	C	B	C	C	C	A	D	A	C
11-20	A	D	C	A	B	D	A	C/D	D	D
21-30	D	B	C	B	D	B	C	B	B	D
31-40	A	C	B	D	D	B	A	B	B	C
41-50	C	A	D	B	B	A	B	C	C	C

# 2 2015 Final

## 2.1 Remarks

### 2.1.1 Question 30

There is a typo error. The name is Paul Baran, not Paul Barron.

### 2.1.2 Question 31

The person who developed the first email system is Ray Tomlinson.

### 2.1.3 Question 32

The transmission rate is 56Kbps. It means that the maximum number of bits to be transmitted in one second is 56K. In one minute, the maximum number of bits to be transmitted is  $56 \times 60K$ , i.e. 3360K bits. In term of byte, it is 420KB.

### 2.1.4 Question 35

The following is the correct output on the console.

You have successfully registered MKT.  
You are now the 46 number of student.  
c:\>

### 2.1.5 Question 36

The following is the correct output on the console.

You have successfully registered ACCT.  
You are now the 36 number of student.  
c:\>

### 2.1.6 Question 37

The following is the correct output on the console.

You have successfully registered ACCT.  
You are now the 36 number of student.  
c:\>

### 2.1.7 Question 38

The following is the correct output on the console.

The sorted numbers are 3 4 5 6 7 9 11.  
c:\>

### 2.1.8 Question 39

The following is the correct output on the console.

The sorted numbers are 11 9 7 6 5 4.  
c:\>

### 2.1.9 Question 40

For the first round, there are 9 pairwise comparisons. For the second round, there are 8 pairwise comparisons. So, for the  $n$ th round, there are  $(10 - n)$  pairwise comparisons. The last round is when  $n = 9$ . Therefore, the total number of pairwise comparisons is  $(9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1)$ , which is 45.

### 2.1.10 Question 46

This question is about Program C. This information is missed in the question.

With reference to the description in Question 40, the total number of swaps (i.e. pairwise comparisons) is

$$(n - 1) + (n - 2) + \cdots + 2 + 1,$$

i.e.  $n(n - 1)/2$ .

However, for the memory space, it should be larger than  $n + 1$  bytes as the program needs space for  $i, j, \text{OPT}[8]$  and  $\text{Opt}$ . Therefore, at least  $n + 12$  bytes memory space is required.

### 2.1.11 Question 47

The following is the correct output on the console.

```
*  
*  
*  
*
```

```
c:\>
```

### 2.1.12 Question 48

The following is the correct output on the console.

```
*****5
```

```
c:\>
```

### 2.1.13 Question 49

The following is the correct output on the console.

```
***3
```

```
c:\>
```

## 2.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	C	D	A	D	C	A	A	B	B	B
11-20	D	B	D	B	A	C	D	C	D	G
21-30	C	B	C	D	B	D	C	D	A	B
31-40	C	D	D	C	B	D	D	-	-	D
41-50	B	D	A	C	A	-	D	A	D	A

## 3 2016 Mid-Term

### 3.1 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	B	D	B	C	A	D	C	B	C	D
11-20	C	C	H	A	D	B	B	D	C	D
21-30	C	B	D	D	D	B	C	B	D	D
31-40	C	A	D	C	C	D	C	B	B	B
41-50	D	A	C	D	C	D	F	D	B	B

## 4 2016 Final

### 4.1 Remarks

#### 4.1.1 Question 33

The following is the correct output on the console.

```
You have successfully registered MKT.  
You are now the 46 number of student.  
c:\>
```

#### 4.1.2 Question 34

The following is the correct output on the console.

```
You have successfully registered ACCT.  
You are now the 36 number of student.  
c:\>
```



### 4.1.3 Question 35

The following is the correct output on the console.

The sorted numbers are 3 4 5 6 7 9 11.

c:\>

### 4.1.4 Question 43

The following is the correct output on the console.

The sorted numbers are 6 5 4 2 1.

c:\>

### 4.1.5 Question 44

The following is the correct output on the console.

The sorted numbers are 1 2 4 5 6.

c:\>

### 4.1.6 Question 45

The following is the correct output on the console.

The sorted numbers are 6 5 4 2 1.

c:\>

### 4.1.7 Question 46

The following is the correct output on the console.

The sorted numbers are 1 2 4 5 6.

c:\>

## 4.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	B	D	A	C	B	B	B	A	A
11-20	A	D	D	A	C	A	A	D	B	E
21-30	D	G	C	D	C	A	A	C	B	C
31-40	D	D	E	E	E	A	C	C	A	E
41-50	A	C	E	E	E	E	C	C	C	G

## 5 2017 Mid-Term

### 5.1 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	B	C	B	D	A	D	D	D	B	C
11-20	D	D	F	D	E	E	E	A	A	C
21-30	D	D	D	C	B	D	D	B	C	B
31-40	A	C	D	E	B	B	D	B	D	A
41-50	C	B	A	D	D	C	C	C	D	C

## 6 2017 Final

### 6.1 Remarks

#### 6.1.1 Question 29

The correct output is the following.

```
*****7
```

```
C:\>
```

#### 6.1.2 Question 32

The correct output is '2 6 1 5 8'.

#### 6.1.3 Question 34

The correct output is the following.

```
You have successfully register MKT.  
You are now the 46 number of student.  
C:\>
```

#### 6.1.4 Question 35

The correct output is the following.

```
You have successfully register ACCT.  
You are now the 36 number of student.  
C:\>
```

### 6.1.5 Question 36

The correct output is the following.

The sorted numbers are 3 4 5 6 7 9 11.

C:\>

## 6.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	A	D	D	F	B	B	D	D	D	D
11-20	D	D	E	D	C	G	B	A	C	A
21-30	B	D	D	C	D	C	D	B	E	D
31-40	D	-	D	E	E	E	A	C	A	A
41-50	A	A	C	C	B	C	C	A	A	A

## 7 2018 Mid-Term

### 7.1 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	C	C	A	A	A	D	C	D	D	D
11-20	D	D	B	C	B	B	A	A	D	B
21-30	B	B	D	C	B	B	B	A	A	B
31-40	B	D	B	D	D	A	D	C	C	C
41-50	A	C	D	D	B	D	D	D	D	A

## 8 2018 Final

### 8.1 Remarks

#### 8.1.1 Question 5

Both statements  $X$  and  $Y$  are true. Beside, statement  $Y$  is the cause of statement  $X$ . Should have one more option  $Y \rightarrow X$ .

#### 8.1.2 Question 21

In accordance with the content in the lecture note, the Sequence ID should be included. Here, the 'Packet ID' should be rewritten as 'Sequence ID'.

### 8.1.3 Question 24

There is a typo error. The correct statement for option (ii) should be written in the following.

```
<i><b>statistical analysis</b></i>
```

### 8.1.4 Question 38

The question number should be 38 instead of 49. The console will show three stars followed by a number 3.

```
***3  
C:>
```

### 8.1.5 Question 39

Below is the correct console output.

```
0 1 2 0 4  
C:\>
```

### 8.1.6 Question 44

As the total number of numbers to be sorted is 9. The 10th winner does not exist. The program might give a monster character and show it on the console.

### 8.1.7 Question 45

As the total number of numbers to be sorted is 9. The 10th loser does not exist. The program might give a monster character and show it on the console.

## 8.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	A	E	B	D	-	E	A	B	D	E
11-20	D	D	B	C	B	D	F	B	B	D
21-30	A	B	B	A	C	C	C	A	A	A
31-40	D	D	C	D	D	C	B	-	-	A
41-50	C	A	C	E	E	C	A	B	C	B

## 9 2019 Mid-Term

### 9.1 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	A	F	F	E	A	C	B	E	E	F
11-20	B	B	D	D	C	C	C	D	B	C
21-30	D	D	B	C	B	D	D	A	D	C
31-40	A	B	C	B	B	D	B	C	D	D
41-50	C	C	D	D	A	D	A	D	A	D

## 10 2019 Final

### 10.1 Remarks

#### 10.1.1 Question 2

As  $4\%4 = 0$ , the following is what we will see on the console.

```
0 3 2 1 0
C:\>
```

So, the answer is E.

#### 10.1.2 Question 12

There is a typo. The last option is '(d)', not '(b)'.

#### 10.1.3 Question 16

There is a typo in Program E. The command below the comment 'Bisection Method' should be corrected to the following.

```
/* Bisection Method */
ERR = fabs(x-y);
```

The function

```
fabs()
```

returns the absolute value of a floating point variable.

## 10.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	E	A	A	A	C	C	A	A	A
11-20	C	D	B	A	B	A	C	C	C	C
21-30	A	C	C	D	C	B	F	B	B	D
31-40	B	D	D	D	D	B	B	A	C	D
41-50	D	C	D	D	C	D	D	B	C	B

## 11 2020 Mid-Term

### 11.1 Remarks

#### 11.1.1 Question 6

Statement  $Y$  in Question 6 should be rewritten as the following.

The decimal number 0.1 can be represented *without error* in both 16-bit floating point format and 16-bit sign magnitude fixed point format.

#### 11.1.2 Question 13

Question 13, it should be "(iii) John von Newmann" in stead of "(ii) John von Newmann".

#### 11.1.3 Question 30

Question 30 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, suppose that the registers are preset as  $RA = 0$ ,  $RB = 1$ ,  $RZ = 0$ ,  $R1 = R2 = R3 = R4 = 0$ . What will be the contents of the registers  $RA$  and  $RZ$  after the following micro-instructions ( $S1$ ,  $S2$ ,  $S3$  and  $S4$ ) have been executed?

$S1$ :  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

$S2$ :  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{16} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

#### 11.1.4 Question 31

Question 31 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, suppose that the registers are preset as  $RA = 0$ ,  $RB = 1$ ,  $RZ = 0$ ,  $R1 = R2 = R3 = R4 = 0$ . What will be the contents of the registers  $RA$  and  $RB$  after the following micro-instructions (S1, S2, S3 and S4) have been executed?

S1:  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

S2:  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{16} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

#### 11.1.5 Question 32

Question 32 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, suppose that the registers are preset as  $RA = 1$ ,  $RB = 0$ ,  $RZ = 0$ ,  $R1 = R2 = R3 = R4 = 0$ . What will be the contents of the registers  $R1$  and  $R2$  after the following micro-instructions (S1, S2, S3 and S4) have been executed?

S1:  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

S2:  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{16} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

### 11.1.6 Question 33

Question 33 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, suppose that the registers are preset as  $RA = 1$ ,  $RB = 0$ ,  $RZ = 0$ ,  $R1 = R2 = R3 = R4 = 0$ . What will be the contents of the registers  $R3$  and  $R4$  after the following micro-instructions (S1, S2, S3 and S4) have been executed?

S1:  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

S2:  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{16} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

### 11.1.7 Question 34

Question 34 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, the following micro-instructions (S1, S2, S3 and S4) have been executed.

S1:  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

S2:  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.



S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{16} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

What of the following instruction have been executed?

### 11.1.8 Question 35

Question 35 should be rewritten as the following.

With reference to the simple processor as shown in the Appendix, Figure 1, the following micro-instructions (S1, S2, S3 and S4) have been executed.

S1:  $S_1 = S_8 = 1$ . The control signals to other connectors are set to 0. The signals to all two-way switches are set to 00.

S2:  $S_{14} = 01$ .  $S_{12} = S_{15} = 10$ . The control signals to all connectors are set to 0. The signals to other two-way switches are set to 00.

S3:  $S_2 = S_5 = S_9 = 1$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

S4:  $S_{12} = 10$ .  $S_{14} = 01$ .  $S_{15} = 10$ . The control signals to other connectors are set to 0. The signals to other two-way switches are set to 00.

What of the following instruction have been executed?

## 11.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	A	C	E	D	B	F	F	C	B
11-20	B	C	C	F	H	D	D	B	C	D
21-30	C	D	B	A	A	A	B	B	A	D
31-40	D	A	A	B	A	D	B	D	D	B
41-50	D	A	D	C	D	D	D	C	C	B

## 12 2020 Final

### 12.1 Remarks

#### 12.1.1 Question 39

There is a typo error in Question 39. Below is the correct statement for option (ii).

(ii) ***statistical analysis***

### 12.1.2 Question 52

The screen will show *six* stars followed by a number 6.

```
*****6
```

So, the answer is E.

### 12.1.3 Question 56

The numbers shown on the console is '2 6 1 5 8'. So, the answer is E.

### 12.1.4 Question 57

The variable 'tmp' has not been declared. The program cannot be compiled. So, the answer is E.

### 12.1.5 Question 67

There is a typo. The last option is '(d)', not '(b)'.

### 12.1.6 Question 69

There is a typo. The program being referred is Program E, not Program D.

### 12.1.7 Question 70

There is a typo in Program E. The command below the comment 'Bisection Method' should be corrected to the following.

```
/* Bisection Method */  
ERR = fabs(x-y);
```

The function

```
fabs()
```

returns the absolute value of a floating point variable.

## 12.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	A	B	B	D	B	A	C	A	B	B
11-20	C	D	B	C	A	A	B	B	A	D
21-30	D	A	A	B	A	C	D	C	D	D
(31-40)	H	-	-	-	-	-	-	-	-	-
(21-30)	-	-	-	-	-	-	A	C	D	C
31-40	D	D	D	F	B	A	B	D	A	B
41-50	B	H	D	A	B	B	D	D	A	C
51-60	B	E	B	D	D	E	E	A	A	A
61-70	A	C	C	A	A	C	D	A	B	A

## 13 2021 Mid-Term

### 13.1 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	B	B	B	B	D	F	E	C	B
11-20	D	E	D	D	B	C	B	D	A	D
21-30	C	D	B	B	A	A	D	D	A	D
31-40	A	C	C	A	A	D	D	D	C	C
41-50	C	E	A	D	E	D	D	D	D	E

## 14 2021 Final

### 14.1 Remarks

#### 14.1.1 Question 9

The setting of the question is debatable. Both statements  $X$  and  $Y$  are true. They are not independent. However, which one is the cause of the other is unclear. So, the answer of the question could be E, F or G.

#### 14.1.2 Question 15

The question is about sending a LINE message at any time and any where. If WiFi is not available at some where, you cannot send LINE messages even

your WiFi option is ON. So, the only correct option is (iii) only. But, there is no such option in the list of the answer. The answer is E.

### 14.1.3 Question 23

Below is the correct answer.

00010100

The answer is E.

### 14.1.4 Question 24

'11111111' is the representation of  $-1$ . So, the absolute difference between '00000000' and '11111111' is one. The answer is B.

### 14.1.5 Question 40

It is not a good question. If the magnetic field is too strong, the physical property of the hard disk might be affected. Thus, the hard disk might even be useless. So, both the answers A and D are accepted.

### 14.1.6 Question 45

Only option (ii) is correct. So, the answer is E.

### 14.1.7 Question 46

The program segments listed in (b) and (d) are the same. So, the answer is either B or D.

### 14.1.8 Question 48

There is a typo. The question should be 'Which of the following statement about ...'.

## 14.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	A	F	E	F	C	B	B	E/F/G	C
11-20	D	D	D	B	E	D	D	D	C	C
21-30	D	A	E	B	A/D	C	D	B	C	A
31-40	B	A	D	A	B	C	C	C	E	A/D
41-50	A	D	A	B	E	B/D	D	B	D	D
51-60	D	D	A	C	A	A	C	E	B	A
61-70	B	A	A	D	D	C	D	B	D	C

## 15 2022 Mid-Term

### 15.1 Remarks

#### 15.1.1 Question 17

For this question, you need to take reference to the following table.

DMX	DMY	X	Y	Y Answer	X Answer
Liar	True	Heaven	Hell	No	Yes
True	Liar	Heaven	Hell	Yes	Yes
Liar	True	Hell	Heaven	Yes	No
True	Liar	Hell	Heaven	No	No

So, the answer is E.

### 15.2 Answers

Questions	1	2	3	4	5	6	7	8	9	10
1-10	D	E	D	C	E	E	B	D	A	B
11-20	C	B	C	B	F	C	E	D	E	E
21-30	A	D	D	D	B	C	C	D	D	D
31-40	D	C	D	D	D	A	A	D	D	D
41-50	B	A	D	A	A	D	D	B	A	C