

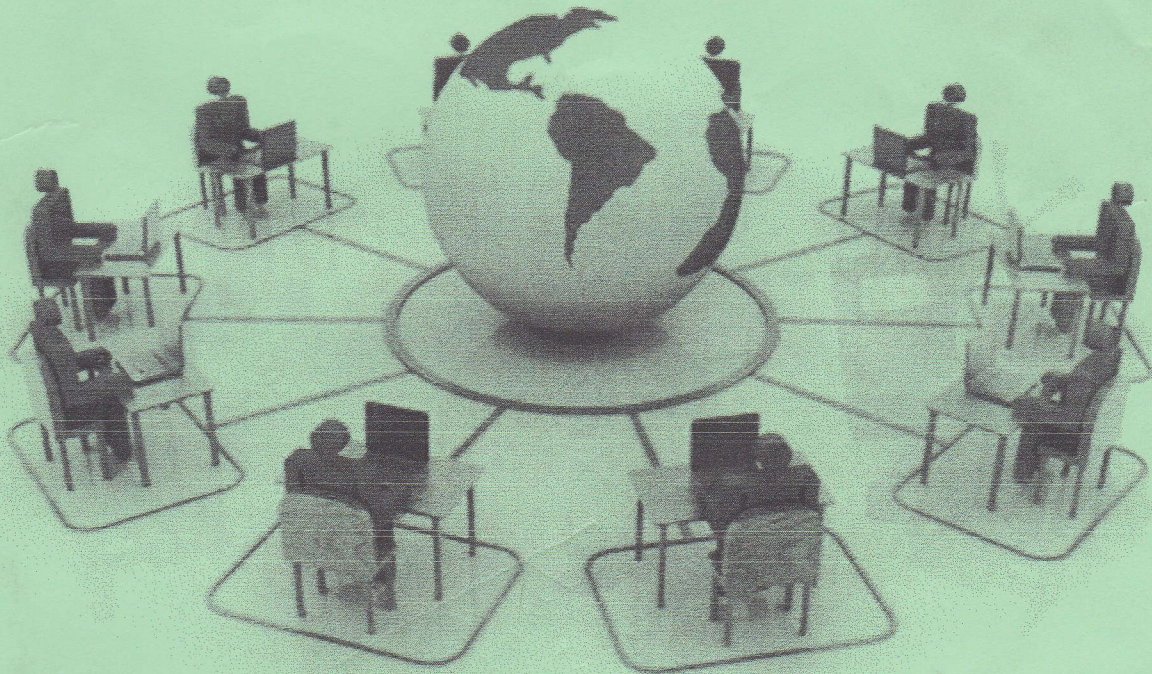


Department of Examinations - Sri Lanka

**G.C.E. (A/L) Examination - 2017**

**20 - Information and Communication Technology**

**Marking Scheme**



This has been prepared for the use of marking examiners. Changes would be made according to the views presented at the Chief/Assistant Examiners' meeting.

Amendments to be included.

## 20 - Information and Communication Technology

### Distribution of marks

#### Paper I

Time Duration 02 hours

Number of Questions 50

Total Marks  $50 \times 2 = 100$

#### Paper II

Time Duration 03 hours

##### **Paper A - Structured Questions**

Number of Questions 04

$$04 \times 10 = 40$$

##### **Paper B - Essay Questions**

Number of Questions 04

$$04 \times 15 = 60$$

**Paper II Total marks =  $40 + 60 = 100$**

$$\begin{aligned} \text{Final marks} &= \frac{\text{pape I} + \text{Paper II}}{2} \\ &= \frac{100 + 100}{2} = 100 \end{aligned}$$

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව  
இலங்கைப் பரீட்சைத் திணைக்களம்

අ.පො.ස. (උ.පෙළ) විභාගය/ க.பொ.த. (உயர் தர)ப் பரீட்சை - 2017

විෂය අංකය  
பாட இலக்கம்

20

විෂය  
பாடம்

තොරතුරු හා සන්නිවේදන තාක්ෂණය

ලකුණු දීමේ පටිපාටිය/புள்ளி வழங்கும் திட்டம்  
[ පත්‍රය/பத்திரம் I

ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.
01.	05	11.	02	21.	03	31.	04	41.	05
02.	01	12.	04	22.	04	32.	01	42.	02
03.	05	13.	All	23.	01	33.	05	43.	04
04.	04	14.	01	24.	03	34.	04	44.	05
05.	03	15.	05	25.	05	35.	05	45.	02
06.	01	16.	04	26.	2 or 4	36.	05	46.	03
07.	05	17.	05	27.	01	37.	03	47.	05
08.	All	18.	03	28.	05	38.	03	48.	03
09.	01	19.	04	29.	02	39.	05	49.	05
10.	05	20.	03	30.	02	40.	02	50.	03

❖ විශේෂ උපදෙස්/ விசேட அறிவுறுத்தல் :

එක් පිළිතුරකට/ ஒரு சரியான விடைக்கு 02 ලකුණු බැගින්/புள்ளி வீதம்

මුළු ලකුණු/மொத்தப் புள்ளிகள் 2 × 50 = 100

# Information and Communication Technology (20)

## Paper II Part A

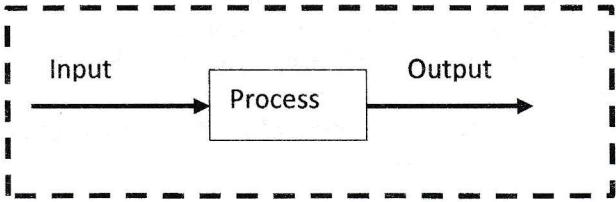
2017

Q. No.	Model Answer	Marks
1.	<p style="text-align: center;">L1 DFD of Sales Information System of Bookland</p>	

Each blank filled in with the correct answer 1 mark

10



<p>3.(b).(ii)</p>	<p>update student set address = '13, School Lane, Jaffna' } A where student_no like '10001%' } B</p> <p>or</p> <p>update student set address = '13, School Lane, Jaffna' } A where student_no like '10001' } B</p> <p>update student set address = '13, School Lane, Jaffna' } A where student_no = '10001' } B (Note: The = sign only works for varchar type attributes)</p> <p>Or</p> <p>update student set address = '13, School Lane, Jaffna' } A (Assumption: Only one student record in the database) } B</p>	<p>[A only] 2 or 0 [A and B] 3</p> <p style="text-align: right;">3</p>
<p>4.(a).(i)</p>	 <p>Rectangle is System boundary</p> <p>Rectangle shape system boundary</p>	<p style="text-align: right;">1</p>
<p>4.(a).(ii)</p>	<p>In closed system both <b>input and output</b> are available <b>within the system</b>.</p> <p>Or</p> <p>A sentence with the same meaning</p>	<p>4 or 0</p> <p style="text-align: right;">4</p>
<p>4.(b)</p>	<p>person(NICNo) mobilePhone(TelephoneNo, NICNo)</p> <p>Each correct relation with attributes 1 mark Each primary key 1 mark (only if the relation is correct) 1 : M relationship (No more than two relations)</p> <p>Note: 1. If tables are drawn 1 mark for both correct tables. 2. <u>Any form of words</u> given in the question is acceptable</p>	<p>2 2 1</p> <p style="text-align: right;">5</p>

# Information and Communication Technology (20)

## Paper II Part B

### 2017

Q. No.	Model Answer	Marks																																				
<b>1.(a)</b>	Air-conditioner (Q) <span style="float: right;">[Define output]</span>	1																																				
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>A</td><td>B</td><td>C</td><td>Q</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td></tr> </table> <span style="margin-left: 20px;">[Correct input columns + 8 combinations]</span> <span style="margin-left: 20px;"><i>A, B, C</i></span> <span style="margin-left: 20px;">[Correct output column]</span>	A	B	C	Q	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	1	0	0	0	1	0	1	0	1	1	0	1	1	1	1	0	1+1 - 2 or 0 (No Partial Marks)
	A	B	C	Q																																		
	0	0	0	0																																		
	0	0	1	0																																		
	0	1	0	1																																		
	0	1	1	0																																		
	1	0	0	0																																		
	1	0	1	0																																		
	1	1	0	1																																		
1	1	1	0																																			
$Q = A'.B.C' + A.B.C'$ $= B.C'.(A'+A)$ $= B.C'$	[Boolean expression] 3 distributive law } complement law } [At least one correct rule] 1 [Solution] 1																																					
	[Circuit] 3 or 0 Optional																																					
<div style="border: 1px dashed black; padding: 5px; display: inline-block;"> </div>	Optional																																					
$Q = B.C'$	[Solution] 1																																					
$Q = B.C'$	[Solution] 1																																					
$Q = B.C'$	[Solution] 1																																					
$Q = B.C'$	[Solution] 1																																					
$Q = B.C'$	[Solution] 1																																					
<b>1.(b)</b>	Yes. Input that represents Switch (A) is <b>not</b> in the Boolean expression/circuit/solution. Therefore, it is <b>not</b> required for the operation of the air-conditioner.	1 1 <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; text-align: center; margin: 0 auto;">2</div>																																				

Agree 2/2 marks  
 2/2 marks Yes  
 2/2 marks  
 2 marks

2.

Assume that the entire private address range is used (it can be any range)

Since there are 4 subnets, it is required to divide the address range into 4 segments.

For this, add two more bits to the subnet mask.

Subnet mask length becomes 10.

11111111.11000000.00000000.00000000

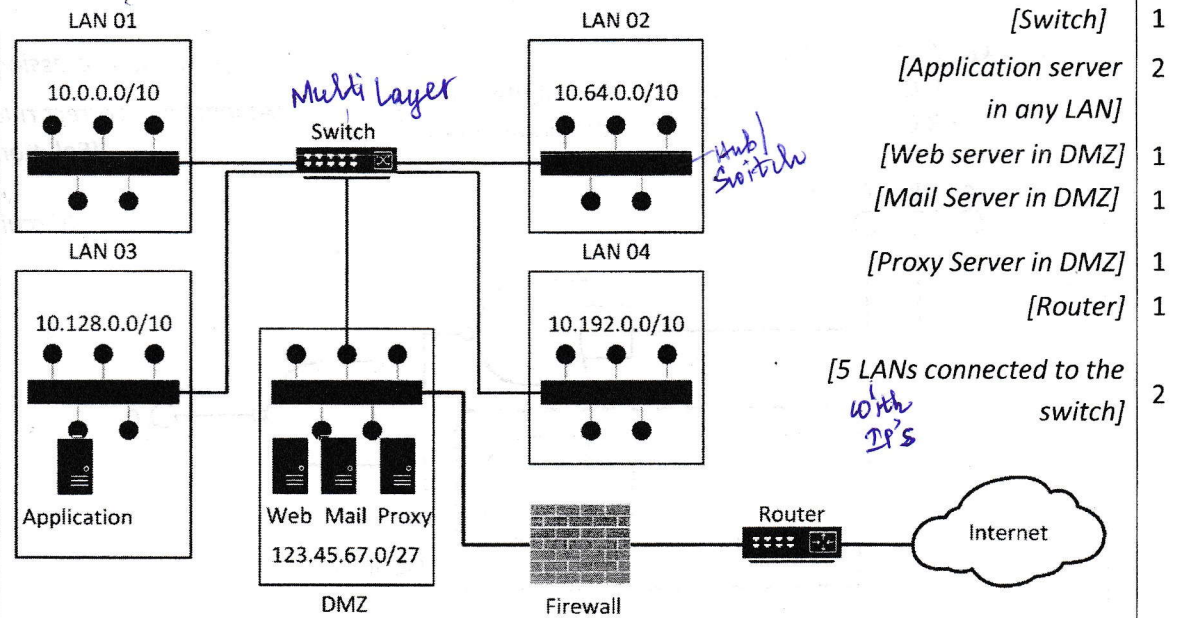
Therefore, the 4 subnets would be:

- |  |           |   |
|--|-----------|---|
| 1. 00001010.00000000.00000000.00000000 = 10.0.0.0/10   | } [1 x 4] | 4 |
| 2. 00001010.01000000.00000000.00000000 = 10.64.0.0/10  |           |   |
| 3. 00001010.10000000.00000000.00000000 = 10.128.0.0/10 |           |   |
| 4. 00001010.11000000.00000000.00000000 = 10.192.0.0/10 |           |   |

(if they decide to use /24 ranges, they should assume that 255 addresses are enough for each subnet. Then they should show the selection of /24 ranges.)

Note: If the selected ranges are shown in the diagram these 4 marks can be given

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 Needed Devices: **05 Hubs, Switch, Router, Firewall, Web Server, Mail Server, Proxy server, Application Server.**



Local Area Area Connect Router  
 Router  
 (Ports)  
 Normally

Since any computer in any subnetwork can access resources in all subnetworks, the application server can be established in any subnetwork. Since it is for internal clients, it should not be located in the DMZ.

Note: 1.Proxy Server could be directly connect to the Switch

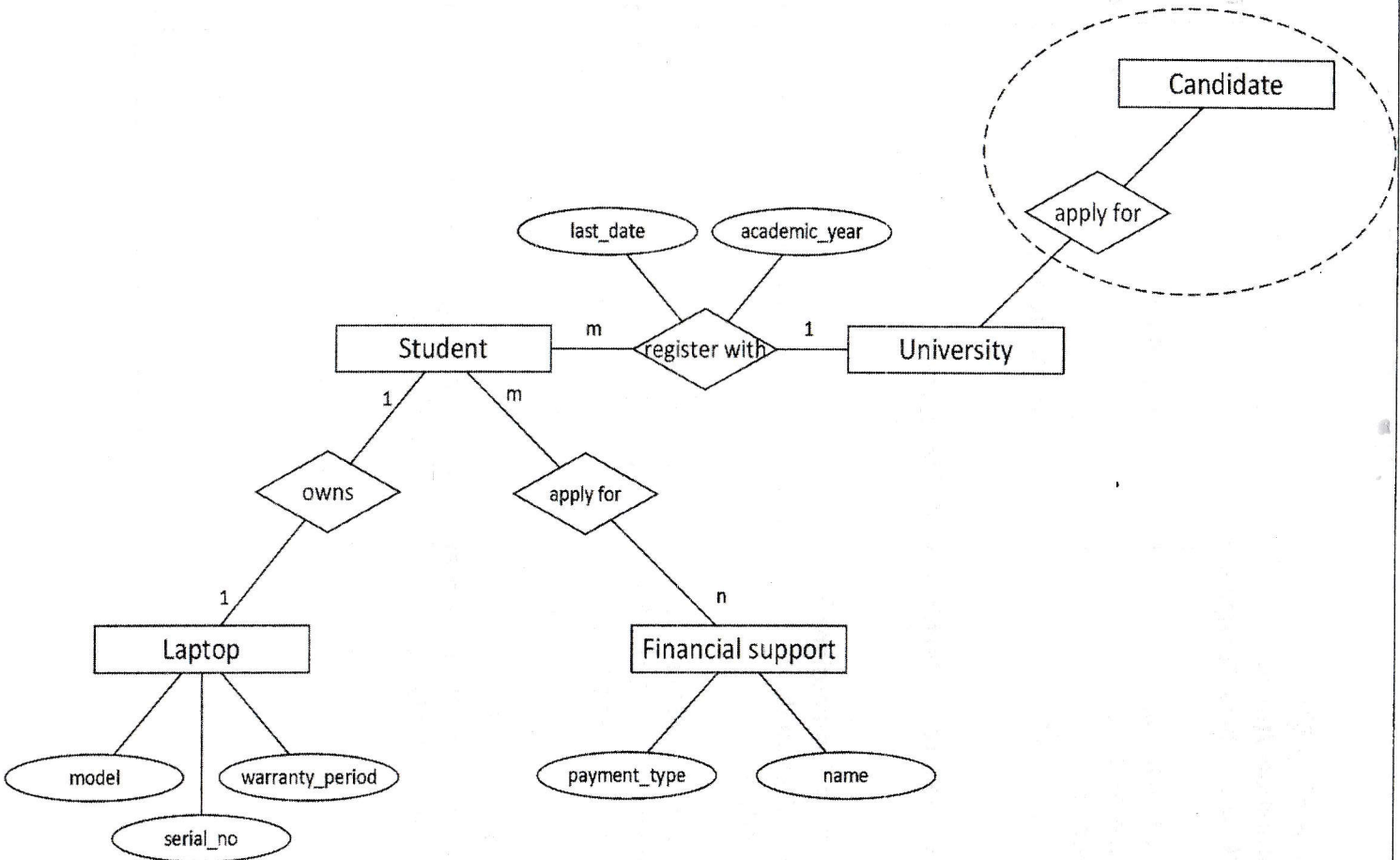
-----  
 When the packet goes to the proxy server, its source IP address is rewritten with the public IP address of proxy server. 2



3.(a)	G2C or Government to Consumer  Note: Government to Citizen only 2 marks	3  <b>3</b>
3.(b)	G2B or G2E, It is a service provided in online by the Government to Business or Employees.	1 1 <b>2</b>
3.(c)	Because it is a service provided by business to <b>government</b> . Therefore it is B2G.	4 1 <b>5</b>
3.(d)	Law: <b>To prepare fine calculations mechanism</b> according to the ( <i>criticality of the identified place</i> ). Epidemic Control Division: (To develop formula to measure the <i>criticality of the identified place related to dengue breeding</i> ).	3  2 <b>5</b>

<p><b>4.(a)</b></p>	<pre> graph TD     Start([start]) --&gt; Input[/Read house hold no (hno) Past Reading (rpast) Present Reading (rpresent)/]     Input --&gt; Calc1[unitsUsed = rpresent - rpast payment = 0]     Calc1 --&gt; Dec{unitUsed &gt; 64?}     Dec -- no --&gt; Calc2[payment = unitsUsed * 5.00]     Dec -- yes --&gt; Calc3[payment = 64 * 5.00 + (unitUsed - 64) * 10.00]     Calc2 --&gt; Print[/print payment/]     Calc3 --&gt; Print     Print --&gt; End([end])     </pre>	<p>[Input] 1</p> <p>[Calculation] 1</p> <p>[Condition] 1</p> <p>[Calculation] 1</p> <p>[Calculation] 1</p> <p>[Print] 1</p> <p>Overall (start/end) 1</p> <p style="text-align: center; border: 1px solid black; border-radius: 50%; width: 30px; margin: 0 auto;">7</p>
<p><b>4.(b)</b></p>	<pre> hno = input("Enter house hold number -&gt;") rpast = int(input("Last meter reading -&gt;")) rpresent = int(input("Present meter reading -&gt;")) unitsUsed = rpresent - rpast if unitsUsed &gt; 64:     payment = 64 * 5.00 + (unitsUsed - 64) * 10.00 else:     payment = unitsUsed * 5.00 print(payment)     </pre> <p>Assumptions : The assumptions are based on the programme</p> <ul style="list-style-type: none"> <li>• The present meter reading is higher than the past meter reading</li> <li>• Integer values should be entered for present and past meter readings</li> </ul>	<p>[Input] 1</p> <p>[if with correct computation] 1</p> <p>[else with correct computation] 1</p> <p>[Print] 1</p> <p style="text-align: center; border: 1px solid black; border-radius: 50%; width: 30px; margin: 0 auto;">4</p>
<p><b>4.(c)</b></p>	<pre> def writetofile(houseNo, rpast, rpresent, charge):     f = open("deb.txt", "a")     print(houseNo, rpast, rpresent, charge, file=f, sep=",")     f.close()     </pre> <p>Note: f.write(str( houseNo)+ " " + str(rpast)+ " " + str(rpresent) + " " + str(charge)) f.write("%s %s %s %s" % (houseNo, rpast, rpresent, charge))</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p style="text-align: center; border: 1px solid black; border-radius: 50%; width: 30px; margin: 0 auto;">4</p>

5.



Entities 1x 4  
 Relation with correct cardinality 1x3  
 Acceptable attributes attached to any entity 1 mark each maximum 5  
 Attributes attached to relation 1x2  
 Circled section

4  
 3  
 5  
 2  
 1

<p><b>6.(a)</b></p>	<pre> &lt;html &gt;   &lt;head&gt;     &lt;meta charset="utf-8"&gt;     &lt;title&gt;Information&lt;/title&gt;     &lt;style&gt; OR &lt;style type="text/css"&gt;       li{         font-family: calibri;         font-size: 14pt;         color: red;         list-style: square;       }     &lt;/style&gt;   OR &lt;link rel="stylesheet" type="text/css" href="def.css"&gt;   &lt;/head&gt;   &lt;body&gt;     &lt;h1&gt;Student Art Competition&lt;/h1&gt;     &lt;h2&gt;Theme: Litter on the environment &lt;/h2&gt;     &lt;h3&gt;PRIZES&lt;/h3&gt;     &lt;ul&gt;       &lt;li&gt;1st place Rs. 10,000/=&lt;/li&gt;       &lt;li&gt;2nd place Rs. 7,500/=&lt;/li&gt;       &lt;li&gt;3rd place Rs. 5,000/=&lt;/li&gt;     &lt;/ul&gt;      &lt;h3&gt;ENTRY FORM&lt;/h3&gt;     &lt;p&gt;Please fill and submit this &lt;a href = "form.html" target = _blank&gt;       online entry form&lt;/a&gt; to enter the competition. &lt;/P&gt;     &lt;/body&gt; &lt;/html&gt;                 </pre>	<p>(3)</p> <p>4</p> <p>(3)</p> <p>2</p> <p>1</p> <p>2</p> <p>9</p>
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6.(b)	<pre> &lt;html &gt;   &lt;head&gt;     &lt;meta charset="utf-8"&gt;     &lt;title&gt;Entry Form&lt;/title&gt;   &lt;/head&gt;    &lt;body&gt;     &lt;h1&gt;Art Competition Online Entry Form 2017&lt;/h1&gt;     &lt;h3&gt;Theme: Litter on the environment&lt;/h3&gt;     &lt;form method = "get" action = "script.php"&gt;       Name: &lt;input type="text" name="name" &gt;       &lt;p&gt;Gender:         &lt;input type="radio" name="sex" value="male" &gt; Male         &lt;input type="radio" name="sex" value="female" &gt; Female       &lt;/p&gt;        &lt;p&gt;Grade Category       &lt;select name="ageGroup"&gt;         &lt;option value="g1"&gt;Grade 1 - 2&lt;/option&gt;         &lt;option value="g2"&gt;Grade 3 - 6&lt;/option&gt;         &lt;option value="g3"&gt;Grade 7 - 10&lt;/option&gt;         &lt;option value="g4"&gt;Grade 11 - 13&lt;/option&gt;       &lt;/select&gt;&lt;/p&gt;        &lt;p&gt;Art media: &lt;/p&gt;       &lt;input type="checkbox" name="media1" value="Colour" &gt;         Water Colours       &lt;br /&gt;       &lt;input type="checkbox" name="media2" value="Pencils" &gt;         Colour Pencils       &lt;br /&gt;       &lt;input type="checkbox" name="media3" value="Crayon" &gt; Crayon       &lt;br /&gt;       &lt;input type="checkbox" name="media4" value="Chalk" &gt; Chalk        &lt;p&gt;&lt;input type = "reset" value = "Clear your Entries"&gt;&lt;/p&gt;        &lt;p&gt;&lt;input type="submit" value="Submit" &gt;&lt;/p&gt;      &lt;/form&gt;   &lt;/body&gt; &lt;/html&gt; </pre>	<p>[&lt;form&gt; and &lt;/form&gt;] 1</p> <p>} 1</p> <p>} 1</p> <p>} 1</p> <p>} 1</p> <p>1</p> <p>1</p>
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