

NAME :

**Open book, open notes, but please do not ask questions.  
Write all answers on these sheets.**

question	1	2	3	4	5	6	total
points							
maximum	15	15	20	20	15	15	100

1. To process preferences we create forms, where preferences are listed using checkboxes.  
Write code for the function

```
def WriteForm(n,L,p):  
    """  
    Returns the string that defines an html form.  
    The input parameters are  
    n is the name of the checkbox,  
    L is a list of preferences,  
    p contains the name of the string which  
    will handle the input form.  
    The value of each element in the checkbox  
    is its position in the list.  
    One submit button concludes the form.  
    """
```

2. To order a certain good in a certain quantity, an html form has two input elements: `good` for the name of the good, and `quantity` for the number of items ordered.

The script which handles this form writes plaintext to the web page. If the name of the good is missing it writes "**please provide name of good**". The default value of `quantity` is one. If the name of the good is provided, the script confirms writing "**ordered <n> of <good>**", where `n` is the quantity and `good` the name of the good.

Write the code of the script which handles this form in the way described above.

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3. Suppose that data to be entered in a database of used cars is stored on file. For each car there is one line on the file. For example, the file `cars.txt` could look like.

```
{ 'make': 'Toyota', 'year': 2001, 'price': 6995.21 }  
{ 'make': 'Honda', 'year': 2005, 'price': 13798.25 }
```

For every car we store its make, year and sales price in a dictionary with keys `'make'`, `'year'`, and `'price'`. Then running the script on the file `cars.txt` prints

```
(0, 'Toyota', 2001, 6995.21)  
(1, 'Honda', 2005, 13798.25)
```

Give the code to open the file `cars.txt` and to write the tuples to screen.

/20

4. Consider a server to perform simple calculations. The server listens for one client to send an arithmetic expression, e.g.:  $4*8$ . The server computes the value (in this example 32) and sends the result to the client.

(a) For the client/server program to work, the server and the client have to agree on certain issues. What are these issues? Describe those elements *common* in the code for both client *and* server.

(b) Write code for the function below:

```
def compute(server,buffer):  
    """  
    On input are in server the server socket  
    and in buffer the buffer size.  
    The server accepts connection from a client  
    and waits for an arithmetic expression.  
    Then the server sends the result of the  
    expression to the client.  
    """
```

5. Suppose we want to develop a screensaver. We view the screen as a grid of rectangles. Threads determine grayscales of each rectangle at random, after sleeping between 1 and 6 time units before generating a new random grayscale. To develop this screensaver, we first simulate the multithreaded generation of the grayscales.

The main program prompts for the number of rows and columns. The names of the threads are tuples  $(i, j)$  with  $i$  and  $j$  the row and column of the rectangular area of the screen for which the thread will generate grayscales.

Using `ScreenThread` as name of the class which defines the behavior of the threads, write code for the main program.

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6. We can measure the complexity of a web page by counting the `<` (less than) symbols. Write code for the following function:

```
def CountLT(url):  
    """  
    Opens the web page defined by the url and returns the number  
    of '<' symbols found on the web page.  
    Returns -1 if opening of the web page fails.  
    """
```

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