(1) What is the advantage of using segmentation?

The primary advantage of the memory segmentation is that managing memory addresses for (internal) components in programs will be easier.

(2) How is “segmentation fault” caused (make sure to answer this question using the appropriate technical term(s) the CS286 lectures already covered)?

Segmentation fault occurs when the submitted offset address exceeds the size of the memory segment.

(3) Which of “page fault” or “segmentation fault” is fatal?

Segmentation faults are fatal (programs will crash), while page faults are not.
(4) What should you check in your program source code files, when (or after) your programs stop running because of a segmentation fault? Mention at least two.

- Pointers
- Arrays

(5) Show a sketch of “memory segmentation” combined with “virtual memory”.

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Segmentation combined with paging:

<table>
<thead>
<tr>
<th>Seg #</th>
<th>Base</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>0000</td>
<td>0949</td>
</tr>
<tr>
<td>0002</td>
<td>0950</td>
<td>2459</td>
</tr>
<tr>
<td>0003</td>
<td>3410</td>
<td>0608</td>
</tr>
</tbody>
</table>

Check offset ≤ Limit

NO Protection Error

YES

Logical Address

Segmentation

Linear Address

Page table

Process#

Physical Address

Offset