$_free_list; //Freeenvironmentlist//(linkedbyEnv->$
$env_link)$
$_NULL,$
$_KT >>$
$3] =$
$SEG(STA_X|STA_R, 0x0, 0xffffffff, 0),$
$_KD >>$
$3] =$
$SEG(STA_W, 0x0, 0xffffffff, 0),$
$_UT >>$
$3] =$
$SEG(STA_X|STA_R, 0x0, 0xffffffff, 3),$
$_UD >>$
$3] =$
$SEG(STA_W, 0x0, 0xffffffff, 3),$
$_init_percpu()[GD_TSS0 >>$
$3] =$
$SEG_NULL;$
$_pd =$
$sizeof(gdt) - 1, (unsignedlong)gdt;$
$_BAD_ENVonerror.//Onsuccess, sets*$
$env_storetotheenvironment.//Onerror, sets*$
$env_storetoNULL.//intenvid2env(envid_tenvid, structEnv*$
$*env_store, boolcheckperm)structEnv * e;$
$_store =$
$curenv; return0;$
$_idfieldinthatstructEnv//toensurethattheenvidisnotstale//(i.e., doesnotrefertoa_previous_environment//thatusedthesa$
$envs[ENVX(envid)]; if(e->$
$env_status ==$
$ENV_FREE||e->$
$env_id! =$
$envid)*env_store = 0; return - E_BAD_ENV;$
$_parent_id! =$
$curenv->$
$env_id)*env_store = 0; return - E_BAD_ENV;$
$_store =$
$e; return0;$
$_idsto0, //andinsertthemintotheenv_free_list.//Makesuretheenvironmentsareinthefreelistinthesameorder//theyareint$
$_init_percpu();$
$_init_percpu(void)lgdt(gdt_pd); //ThekernelneverusesGSorFS, soweleavethosesetto//theuserdatasegment.asmvolatile("$
$_pgdiraccordingly, //andinitializethekernelportionofthenewenvironment'saddressspace.//DoNOT(yet)mapanythingi$
$0onerror.Errorsinclude :$
$//-$
$E_NO_MEMifpagedirectoryortablecouldnotbeallocated.//staticintenv_setup_vm(structEnv*$
$e)inti; structPageInfo * p = NULL;$
$_alloc(ALLOC_ZERO)))return-$
$E_NO_MEM;$
$_pgdirandinitializethepagedirectory.////Hint :$
$//-$
$TheVAspaceofallenvsisidenticalaboveUTOP//(exceptatUVPT, whichwe'vesetbelow).//Seeinc/memlayout.hforperm$
$Yes.//(MakesureyougotthepermissionsrightinLab2.)//-$
$TheinitialVAbelowUTOPisempty.//-$
$Youdonotneedtomakeanymorecallstopage_alloc.//-$
$Note :$
$Ingeneral, pp_refisnotmaintainedfor//physicalpagesmappedonlyaboveUTOP, butenv_pgdir//isanexception-$
$-youneedtoincrementenv_pgdir's//pp_refforenv_freetoworkcorrectly.//-$
$Thefunctionsinkern/pmap.harehandy.$
$_pgdir =$
$page2kva(p); memmove(e->$
$env_pgdir, kern_pgdir, PGSIZE); memset(e->$
$env_pgdir, 0, PDX(UTOP)*$
$sizeof(pde_t)); p->$
pp_ref+
$+;$
$_pgdir[PDX(UVPT)] =$
$PADDR(e->$
$env_pgdir)|PTE_P|PTE_U;$
$_store.////Returns0onsuccess, <$
$0onfailure.Errorsinclude :$
$//-$
$E_NO_FREE_ENVifallNENVSenvironmentsareallocated//-$
$E_NO_MEMonmemoryexhaustion//intenv_alloc(structEnv*$
$*newenv_store, envid_tparent_id)int32_tgeneration; intr; structEnv * e;$
$_free_list))return-$
$E_NO_FREE_ENV;$
$_setup_vm(e)) <$
$0)returnr;$
$_idforthisenvironment.generation =$
$(e->$