#### МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

федеральное государственное автономное образовательное учреждение высшего

## образования "САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ АЭРОКОСМИЧЕСКОГО ПРИБОРОСТРОЕНИЯ"

Кафедра № 44

**УТВЕРЖДАЮ** 

Руководитель направления

д.т.н.,проф.

(должность, уч. степень, звание)

М.Б. Сергеев

#### РАБОЧАЯ ПРОГРАММА ДИСЦИПЛИНЫ

«Научный семинар» (Наименование дисциплины)

Код направления подготовки/ специальности	09.04.01 (02)
Наименование направления подготовки/ специальности	Информатика и вычислительная техника
Наименование направленности	Мультимедийные приложения со сложными пользовательскими интерфейсами (виртуальная и дополненная реальности)
Форма обучения	очная

Санкт-Петербург- 2022

#### Лист согласования рабочей программы дисциплины

Программу составил (а)	1	
доц.,к.т.н.,доц.	«10» марта 2022 г.	А.В.Никитин
(должность, уч. степень, звание)	(подпись, дата)	(инициалы, фамилия)
Программа одобрена на засед	дании кафедры № 44	
от «10» марта 2022 г., прото	кол № 6-21/22	
Заведующий кафедрой № 44	Mah	1
д.т.н.,проф.	«10» марта 2022 г.	М.Б. Сергеев
(уч. степень, звание)	(подпись, дата)	(инициалы, фамилия)
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(должность, уч. степень, звание)	«10» марка 2022 г. (подпись, дата)	(инициалы, фамилия)

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 $\label{liminary} Ij\_ih^Z\Zg^bb\_kpbiebgu\quad ij\_^mkfZljb\Z_l\quad ke\_^mxsb\_\quad nhjfumq\_[gh]h\quad ijhkp\_fkbkgZZju\quad kZfhklhyl\_evgZy\quad jZ[hlZ\quad h[mqZxs\_]hky$ 

ljh]jZffhc ^bkpbiebgu ij\_^mkfhlj\_gu ke\_^mxsb\_ \b^u cdhgljhev mki\_\Z\_fhklb ijhf\_`mlyhqgnZhyjafZbpl.\_lkZlZpb

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1.  $l_j_qgv ieZgbjm_fuo j_amevlZlh\ h[mq_gby ih ^b]$ 

1.1. P\_eb ij\_ih^Z\Zgby ^bkpbiebgu

 $Kh^-j`Zgb\_^hkpbiebgu ho`Zlu\Z_l & klmn_alZgbujbukhk ihemqklm^-glZfb g_h[oh^bfuo agZgbc mf_gbc b gZ\udh\ \ h[eZbkke_^h\Zgbc wlZih\ \uiheg_gby GBJ ih^]hlh\db gZmqqijh_dlZfb gZ \k_o wlZiZo _]h `bag_ggh]h pbdeZ Zml`Z^d`g_b xh ij_amevlZlh\ gZmqguo bkke_^h\Zgbc \ l q ijb ih^]hlh\d_ \ujZ[hlu fZ]bkljZ$ 

1.2. > bkpbie boogbZ^bl \ khklZ\ h[yaZl\_he[yiZgahoc\ZqZ\_keijbzhg]hjzEffu \ukr\_]h h[jZah\Zgb≞bHl^<ZHe\_\_

1.3. l\_j\_q\_gv ieZgbjm\_fuo j\_ambeyvliZhlh^\bkupinbiqe\_bgg\_ khhlg\_kieZgbjm\_fufb j\_amevlZlZfb<hhk\h\_gby Hl

 $LZ[ebp + Zl_j qgv dhfi_l bgbpgb^dodZlhbjdh^hklb`_gby$ 

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Mgb\_jkZevgu_ dhfi_l_gpbb	M D Kihkh[_g hkms_kl\eylv djblbq_kdbc ijh[e_fguo kblmZpbhck <b>g</b> 区 kbkl_fgh]h ih^oh^Z \ujZ[Zlu\Zlv kljZl_]bx ^_c	MD A agZlv f_lh^u djblb ZgZebaZ b kbkl_fgh]h ih^o jZajZ[hldb kljZl_]bb ^_ckl \uy\e_gby b j_r_gby ijh[e_kblmZpbc MD A agZlv pbnjh\u_ j_kbgkljmf_gluj\bkku_^ey j_r_gaZ^Zq ijh[e_f ijhn_kkbhgZ^_yl_evghklb
M g b \ _ j k Z e v g u _ d h f i _ l _ g p b b	MÐ Kihkh[_g mijZ\eylv ijh gZ \k_o wlZi. `bag_ggh]h p	MD A agZIv wIZiu `bag_ijh_dIZ \b^u j_kmjkh\ b h ^ey j_r_gby ijh_ZMJqqo a g_h[oh^bfu_ ^ey hkms_kl\ ijh_dIghc ^_yl_evghklb ijZ b ijbgpbiu mijZ\e_gby ijh_MD A agZIv pbnjh\u_ bg ij_^gZagZq_ggu_ ^ey jZaj ijh_dIZ j_r_gby aZ^Zqb fijh]jZffgu_ kj_^kl\Z mijZ\e ijh_dIZ j_r_gby aZ^Zqb fijh_dIZfb MD M mf_lv hij_^eylv p_wIZiu hkgh\gu_ gZijZ\e_gh[tykgylv p_eb b nhjfmebjk\yaZggu_ k ih^]hlh\dhc b ijh_dIZ MD M mf_lv \u^\b]ZIv Zevl_jgZlb\gu_ \ZibZglu ^p_evx \ujZ[hldb gh\uo hilt Ze]hjblfh\l^bckih ijh_dlm
Mgb\_jkZevgu_ dhfi_l_gpbb	MÐ Kihkh[_g hj]Zgbah\u\Z jmdh\h^blv j2 dhfZg^u	MĐ A ag ZIv f_Ih^bdb nh dhfZg^u f_Ih^u wnn_dlb\g jmdh\h^kI\Z dhee holl byth\hogfu_ I_hjbb eb^_jkI\Z b kIbeb j

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2. F\_klh ^bkpbiebgu \ kljmdlmj\_ Hl

> bkpbiebbgZ\_[[Zab],ZlvbyZgaZgbyo jZg\_\_ ijbhhjjmdqZgsbfbkyijbbamq\_gbbke\_^mxsbo ^bkpbiebg

- $@GZm-qbgkhke_^h\Zl_evkd!ZyjZ[hlZ]$
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AgZgby ihemq\_ggu\_ ijb bamq\_gbb fZl\_jbZeZ ^ZgghckZfhklhyl\_evgh\_ agZq\_gb\_et/Zadh\bZlfMrk]ymijbkbibamq\_gbb ^jm]bo

 $- \otimes GZm \cdot qbgkhk \cdot e \_ ^h \setminus ZI \_evk \cdot d \cdot Zy jZ[h \mid Z$ 

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3. H[t\_fb ljm^h\_fd^\tbkklp\biebgu

>Zggu\_ h[ h[s\_f h[t\_f\_ ^bkpbiebgu \_lejnngbloofdlbn4khb\ hnlq^\_[jZ[hlu ih ^bkpbiebg\_ b jZkij\_^\_e\_gb\_ wlhksl]Zmf^hij\_f^dkhlkZl\be\_ibgulz[ebp\_

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1	2	3	4	5
Общая трудоемкость дисциплины,	3/ 108	1/36	1/36	1/36
A? qZk	3/ 100	1/ 30		
Из них часов практической подготовки				
$A$ удиторные занятия $k_1 h q Z k$	85	17	34	34
\ lhf qbke_				
e_dpbb E qZk				

ijZdlbq_kdb_ k_fbgZjkdb_ qZk	85	17	34	34
eZ[hjZlhjgu_jZ[hluqZEkJ				
$dmjkh\hc ijh_dl jZ[hlZ D]$				
wdaZf_g qZk				
Самостоятельная работа \k_]h qZk	23	19	2	2
Вид промежуточной аттестации: а Z q	AZq_		$AZq_{-}$	$AZq_{\perp}$
^bnn aZq_I wdaZf_g AZ	$AZq_{-}$	AZ $q_{-}$		
Wda	AZq_			

ljbf\_qgb\*\*dZg^b^Zlkdbc wdaZf\_g

4. Kh^\_j`Zgb\_ ^bkpbiebgu

4.1. JZkij\_^\_e\_gb\_\_ljm^h\_fdhklb ^bkpbiebgu ih j.Za^\_eZf JZa^\_eu l\_fu ^bkbbbieljng@h\_fdijhbkl\_v^\_gu \ IZ[ebp\_

LZ[ebp±ZJZa^\_eu l\_fu ^bkpbiebgu bo ljm^h\_fdhklv

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JZa^_e Hkgh\gu_ ihgylby b ^_yl_evghikhlts]hlh\dZ gZmqguo		3			3
Blhhj \ k_f_klj_		17			19
K_f_	klj				
JZa^_e Dhgp_ipbb kbkl_fu		12			
JZa^_ejh_oglZy ^_yl_evghklv		20			2
JZa^_e Mjh\_gv ]hlh\ghklb ijhba\h^kl\Z kbkl_fu		2			
Blh]h \ k_f_		34			2
K_f_	klj				
JZa^_Q_eh\ <u>hj</u> dbh_glbjh\Zggh_ ijh_dlbjh\Zgb_ bgl_jZdlb\guo		15			
JZa^_e [_ki_q_gb_ ijb]h^ghkll bkihevah\Zgby		15			
JZa^_ Bggh\ZpbhggZy ijh^mdp		2			
JZa^9_eLj_[h\ZgfZ]bdkl_jkdhc ^bkk_jlZpbb		2			2
Blh]h \ k_f_		34			2
BIh]	0	85	0	0	23

 $\label{limit} IjZdlbq\_kdZy ih^]hlh\dZ aZdexqZ\_lky \ \ g_ihkj\_^kl\hlimit h[mqZxsbfbky hij\_^\_e\_gguo ljm^h\uo nmgdpbc k\yaZijhn\_kkbhgZevghc ^\_yl\_evghklvx$ 

4.2.  $Kh^{_j}Zgb_{_j}Za^{_eh}bl_{_j}e_{_j}Zgb_{_j}Za^{_eh}bl_{_j}e_{_j}g_{_j}e_{_j}$ 

 $LZ[eb4p2Kh^{_j}Zgb_{_j}Zba4_{_e}he\\_dpbhggh]hpbdeZ$ 

Ghf_j jZa^_e	GZa\Zgb_	b kh^_j`Zgb_	jZa^_euho∖abZb_y

# 4.3. IjZdlbq\_kdb\_ k\_fbgZjkdb\_ aZgylby L\_fu ijZdlbq\_kdbo aZgyhb\_&dbhkdo ijbn\\\\_^\_gu5\ IZ[ebp\_

#### LZ[ebp-ZljZdlbq\_kdb\_ aZgylby b bo ljm^h\_fdhklv

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2	bggh\Z,pkb\bav k < DJF L_fZ F_lh^heh]bq_kdbc Zii	-imiih\7	6	1
2	bkke_^h\Zgby	^ b k d m k k	_	1
3	L_fZ <u[hj gbj="" h[<="" l_fu="" td=""><td></td><td>2</td><td>1</td></u[hj>		2	1
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4	L_fZ Bgl_ee_dlmZevgZy ^_		3	2
	Z\lhjkdh_ iij&ZXfbbZLdhf_g^Zpbb			
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	klZl_c b ij_a_glZpbc			
	K_f_k	Ιj		
5	L_fZ Kbk <u>⊾ib</u> faZg_ggucbpbkolZe,^b		6	3
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6	dhgp_ilmZevgu_ hkgh\u lhqd	^ b k d m k l		
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4.4.  $EZ[hjZlhjgu\_aZgylby]$  L\_fu  $eZ[hjZlhjguoaZgylbcbboljm^h_fdhk6lvijb\_^gu \$ 

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i i	GZbf_gh\Zgb_ eZ[hjZlhjg	qZk	ih^]hIh\c	^bkpl
		•	q Z k	e b g u
	Mq_[gufieZg	hfg_ij_^m	nkfhlj_gh	
	< k _ `			

- 4.5.  $Dmjkh\h_ ijh_gbb_jh\Ziheg_gb_ dmjkh\hc jZ[hluMq_[gufieZghfg_ ij_^mkfhlj_gh]$
- 4.6.  $KZfhkyl_evgZy$   $jZ[hlZh[mqZxsboky < b^u kZfhklhyl_evghc <math>jZh['hhlufblhklvljijb\_^g v]$ .  $LZ[ebp_evghc]$

LZ[eb7p-Z<b^u kZfhklhyl\_evghc jZ[hlu b \_\_ ljm^h\_fdhklv

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$[h^]hhdZ d l_dms_fm dh mki_\Z_fhklb LDM$	2	2		
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Dhgljehvgu_jZ[hlu aZhqgb				
<pre>  Ih^]hIh\dZ d ijhf_`mIhqgh   ZII_kIZpbb I:</pre>	6	2	2	2
< k _ ]	23	19	2	2

5.  $l_j_q_gv_mfq_l[hg^hdq_kdh]h_h[_ki_q_gby_evghc_jZ[hlu_h[mqZxsboky_ih_^bkpbiebgMq_[-gi_hlh^bq_kdb__fZl_jbZeu_^evyghkoZfjhZk[lhh[ymh_g&ZxsbmoklyZaZgu_\ii7-11.$ 

6. I\_j\_q\_ig\_vqZlguo b we\_dljhgguo mq\_[guo ba^Zgbcl\_j\_qgiv\_qZlguo b we\_dljhgguo mqijb[\g\_u^o\_dbZ2](^eZb\_b)bc LZ[eb8p±Z\_j\_q\_ig\_vqZlguo b we\_dljhgguo mq\_[guo ba^Zgbc

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http://www.intuit.ru/studies/cour	$G Dhjh dbgZ = E_hqdbgZ F_lh^bdZ$
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7.  $l_j = q_w e_d ljhgguoh[jZahj\Zklm;kvhg\uobgnhjfZpb-hlgghdhffmgbdZpbhgghck_lb©Bgl_jg_l^a l_j_q_gvwe_dljhgguoh[jZah\ZJ_kexngikuho\bgnhjfZpbhgl_exngikuho\bgnhjfZpbhgl_e_bhgbghgguol_e_dhffmgbdZpbhg@hBcglkjglblgh_h[oh^bfuo^eyhkkhpbghbgbgulib\_^g\left\left] ebp_LZ[ebp9Z <math>\pm l_j = q_w e_dljhgguoh[jZah\jZ]k_mejvkghu\ohlpfgZnpbh-gghl_e_dhffmgbdZpbh@fbgck_kglb\baree_lbare.$ 

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8.  $l_j_q_gv$  bgnhjfZpbhgguo  $l_ogheh]bc$   $8.1. l_j_q_gv$  ijh]jZffgh]h  $h,[_bkki_lnqe_vgabnn_hhifjb$   $hkms_kl\e_gbh[jZh\Zl_evgh]h$   $ijhp_kkZ$  ih  $^bkpbiebg_l$   $l_j_qgbkihevam_ijfhh]]jbZffgh]h$   $h[_ki_jq_by\Zy\e_LZg[eblp0ZL]=q_igjhn]jZffgh]h$   $h[_ki_q_gby$ 

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 $8.2. \ l\_j\_q\_gvbgnhjfZpb-lkgijgZh\hqguo kbblkilh\_evam\_fuo ijhkms\_kl\e\_gbbh[jZah\Zl\_evgh]hijhp\_kkZih^bkpbiebg\_l\_j\_qgvbkihevam\_bfgnhjfZpb-lkgijgZh\hqguo kbilk_l_^fklZ\e\_g \lambda lZ[eb_pt]. \\ LZ[ebptZl_j\_q\_bgnhjfZpb-lkgijgZh\hqguo kbkl_f$ 

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Google Trends
https://www.google.ru/trends/

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GZmqgZy we\_dljhggZy [b[ebhl\_dZ
http://elibrary.ru

GZndb bggh\Zpbb

Ijh\_dlu eZ[hjZlhjbb <u>Dttp:b/gaapJtu/labvr/projects</u>

http://www.rsci.ru/about\_project.php

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9. FZI\_jbZelv\_gongbq\_kdZy [ZaZ KhklZ\fZI\_bjZevb\_nogbq\_kdhc, \_\_\_glZaLpohhbf^ey hkms\_kl\e\_g h[jZah\ZI\_evgh]h ijhp\_kkZ, iijh\_^NbllZp\beileZp\beil

GZbf\_gh\Zgb\_ khklZ\ghc qZk Ghf\_j Zm^blk fZl\_jbZek\_gdngbq\_kdhc [Zau ijbg\_h[oh^bfh 1 EZ[hjZlhpbynjh\uoj\_Zevghkl\_c 22-14

10. Hp\_ghqgju\_kkl\Z ^ey ijh\\_^\_gby ijhf\_`mlhqghc Zll\_kl 10.1. KhklZ\ hp\_ghqguo^eykjj\_m\k\_l^\_gbjyhf\_`mlhqghc Zll\_klZh[mqZxsboky ih ^bikjþbjébg\_\ IZ[3ebp\_ LZ[ebßZ-KhklZ\ hpqgquo kj\_~ekilih\\_^\_giphyf\_`mlhqghc Zll\_klZpbb

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	L_klu

 $10.2. < dZq_kl\_ djbl_jb_\ hp_gdb mjh\gy knhjfbjh\Zgdhfi_l_gpbc h[mqZxsbfbky i][bZfe_egwygzdhfzyeZ hp_gdb knhjfbjh\Zgdhfi_l_gpbc dhlhjZy\iljZb[\e_b^ggZ< l_q_gb_ k_f_kljZ fh`_l bkiholog\gammabgly by\hhc kbkl_fu Mgb\_jkbl_lZ bkihevah\Zgby dhlhjhc mklZgh\e_gu khhl\_lkl\mx$bZde\mfdZeemfdZe=M:J$ 

LZ[ebp4Z+Djbl\_jbb hp\_gdb mjh\gy knhjfbjh\Zgghklb dhfi\_l\_gpb

Hp_gdZ dhfi_l	
5-[ZeevgZy ro	OZjZdl_jbklbdZ knhjfbjh\Zgguo dhfi_
©hlebqgh <sup>a</sup> ©aZql_gh <sup>a</sup>	<pre>±h[mqZxsb&amp;&amp;m[hdh b \k_klhjhgg_ mk\hk fZl_jbZe ±m\_j_geghh]bqgh ihke_^h\Zl_evgh b ]jZfhl ±hibjZykv gZ agZgby hkgh\ghc b ^hiheg l_kgh ijb\yau\Z_l mk\h_ggu_ gZmqgu_ iho ^_yl_evghklvx gZijZ\e_gby ±mf_eh h[hkgh\u\Z_l b Zj]mf_glbjm_l \u^\ ±^_eZ_l \u\h^u b h[h[s_gby ±k\h[h^gh \eZ^l kbkl_fhc ki_pbZebabjh)</pre>
©ohjhrh <sup>a</sup> ©aZqI_gh <sup>a</sup>	<pre>th[mqZxsbl&amp;kjy^h mk\hbe ijh]jZffguc fZl_jb ih kms_kl\m baeZ]Z_l _]h hibjZykv ebl_jZlmju tg_ ^himkdZ_l kgmuso_kgl\lhqqghkl_c tm\yau\Z_l mk\h_ggu_ agZgby k ijZdlb gZijZ\e_gby tZj]mf_glbjm_l gZmqgu_ iheh`_gby t^_eZ_l \u\h^u b h[h[s_gby t\eZ^_l kbkl_fhc ki_pbZebabjh\Zgguo ih</pre>
©m^h\e_l\hjbl ©aZql_ghª	<pre>±h[mqZxsbmokyhbe hhehkdgh\ghc ijh]jZffguc ih kms_kl\m baeZ]Z_l _]h hibjZykv gZ ebl_jZlmju ± ^himkdZ_l g_kms_kl\_ggu_ hrb[db b g_l ±bkiulu\Z_l aZljm^g_gby \ ijZdlbq_kdhf gZijZ\e_gby ±keZ[h Zj]mf_glbjm_ihejZ`m_ogby_ ±aZljm^gy_lky \ nhjfmebjh\Zgbb \u\h^h\ b ±qZklbqgh \eZ^l kbkl_fhc ki_pbZebabjh</pre>
©g_m^h\e_l\hj ©g_ aZql_g	<pre>±h[mqZxsbgky mk\hbe agZqbl_evghc qZk fZl_jbZeZ  ±^himkdZ_l kms_kl\_ggu_ bgrbhodbghkbb iZkkfbli abb iible f \ dbadi labf aZiiZ\e</pre>

10.3. Lbih\u\_ dhogbjon\_e aZ^Zgby beb bgu\_ fZl\_jbZeu <hijhku aZ^Zqb ^ey wdaZf\_gZ ij\_1fklZ\e\_gu \ IZ[ebp\_LZ[ebpZ±<hijhku aZ^Zqb ^ey wdaZf\_gZ

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i i	I_j_q_gv \hijhkh\ aZ^Zq ^ey aZq_IZ	ט ∆bg^	h ^ b d Z l
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2	:jobl_dlmlj <u>Zj</u> fbgu dhgpe <u>v</u> iglom_Zhkgh∖u lhqdb aj	ΜĐ	Α
3	Hkgh\gu_ f_lh^u bkke_^h\Zgbc	ΜĐ	Α
4	ljh_d±wlZiu `bag_ggh]h pbdeZ b hkgh\gu_ ijł	ΜĐ	Α
5	Q_eh\ <u>h</u> qibn_glbjh\Zggh_ ijh_dlbjh\Zgb_ bgl_jZ	ΜĐ	Α
6	Kbkl_fu mijZ\e_gby i <b>;ih<u>k</u>ghZgb</b> uaZ^Zqb ijbf_ju	ΜĐ	Α
7	Hkgh\gu_ wlZiu b aZ^Zqb GBJ	ΜĐ	M
8	AZ^Zqb wIZiZ GBJ © <u[hj bkke_<="" gzijz\e_gbc="" td=""><td>ΜĐ</td><td>M</td></u[hj>	ΜĐ	M
9	H[_ki_q_gb_ ijb]h^ghklb bkihevah\Zgby	ΜĐ	М
10	AZ^Zqb ijhp_kkZ f_g_^`f_glZ e\x^jkhd_bdd_j_kmjk	ΜĐ	Α
11	ljhp_kku hj]ZgbaZpbhggh]h h[_ki_q_gby ijh_d	ΜĐ	Α
12	KljmdlmjZ hlq_lZ h GBJ	HID	Α
13	Hkgh\gu_ wlZiu ZgZebaZ kl_i_gb bamq_gghk	HID	М
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14	J_dhf_g^Zpkblbjmiohlminj_^]hlh\d_ b hnhjfe_gbx gZ	HIĐ	<
	hlq_lh\ klZl_c b ij_a_glZpbc		
15	IjbagZdb bggh\Zpbhgghc ijh^mdpbb	HIĐ	Α
16	F_lh^u pbnjh\uo j_Zevghkl_c \ gZmqguo bkk	HID	Α

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 $I\_j\_q\_gv$   $Ih\_0 IjothevogjuZ[hlih ^bkpbiehb[ogm\_qZxsboky aZhqghch[mq\_g]p\_y/kIZ\e_gu \ IZ9[.ebp_$ 

 $LZ[eb1p34]_{j_q}q_qhqgljhevjp_qZu[dn]$ 

∢ j j	l_j_q_ <b>g</b> lxrgljhe∨jgZu[ohl
	G_ ij_^mkfhlj_gh

 $10.4. \ F_lh^bq_kdb_ \ fZl_jbZeu \ hij_^_eyxsb_ \ ijhp_^mbg^bdZlhjh\ oZjZdl_jbamxsbo \ wlZiu \ nhjfbjh\Zgby \ dhfi_l_ehdZevg ghjfZlb\guo ZdlZo = M:l j_]eZf_glbjmxsbo \ ihjy^lijh\_^_glbvdm]sh_dhgljtnenki_\Z_fhklb b ijhf_`mlhqgtmtmZql<math>Z_x$ kslbZqpkbyb = M:l

- 11. F\_lh^bq\_kdb\_ mdZaZgby ^ey h[mqZxsboky ih hk\h\_g
- 11.1. F\_lh^bq\_kdb\_ mdZaZgby ^eyqhZ[kml bq Z x\s ks o fkbyg iZhj Zmo

Hkgh\ghc p^eeyvxh[mqZxsy\_]ehyk\_ylky kbkl\_fZlbaZpby b h[h[s\_ih bamqZ\_fhc l\_f\_ jZa^\_em nhjfbjh\Zgb\_ mf\_gby jZ[hlzbklhqgbdZfb bgnhjfZpbb khihklZ\eylv b kjZ\gb\Zlv lhqdb ijhqbZlggh\_ \ukdZau\Zlv k\hx lhqdm aj\_gby b l i < khlabar kdhc p\_evx kh^\_j`Zgb\_f k\_fbgZjkdbo aZgylbc y\blace ljm^gu\_ ^ey ihgbfZgby b mk\h\_gby l\_fu jZa^\_eu ^bkpbieknhjfu aZgylbc y\ey\_lkZyy kj\Z\fh\_l\Zlgj\_ih^Z\h\Zh\Zh\zh\qeZyx sb\_\gl\Z\chyj\_r\_gb\_f ihklZ\e\_gghc ijh[e\_fu Z ihbkd \\_jgh]h hl\\_lZ kljhblky g bg^b\b^mZevghc b dhee\_dlb\ghc ^\_yl\_evghklb

ljb ih^]hlh\d\_ d k\_fbgZjkdhfm aZgylbx ih l\_f\_ ijhk g\_h[oh^bfh fbalgyZkgth k ieZghf \_]h ijh\\_^\_gby k ebl\_jZlmj im[ebdZpbyfb ih l\_f\_ k\_fbgZjZ

Lj\_[h\Zgby d ijh\k\_^f\_bggbZxjh\

Hkgh\gufb nhjfZfb hj]ZgbaZpbb k\_fbgZjZ y\eyxlky ]jr jZ[hlZ \ dhfZg^\_ d\_cku ijh[e\_fgh\_ h[mq\_gb\_ ijh\_dlgh\_ h[m

- 11.2. F\_lh^bq\_kdb\_ mdZaZgby ^ey h[mqZxskbZofkhyk lihhy lijheov lg  ${}^{\rm h}$ jZ[hlu
- > ey h[mscpZoxky ih aZhqghc nhjf\_ h[mq\_gby kZfhklhyl\_e\dexqZlv \ k\_[y dhgljhevgmx jZ[hlm

F\_lh^bq\_kdbfb fZl\_jbZeZfb gZijZ\eyxsbfb kZfhklhyh[mqZxsbybekyyxlky

- mq\_{fg\_hlh^bq\_kf2Tb\_cjbZhe^bkpbiebg\_
- f\_lh^bq\_kdb\_ mild Z\auZlog eb oy\_gbx dhgljhevguo jZ[hl ^ey hih aZhqghc nhjf\_ h[mq\_gby
- 11.3. F\_lh^bq\_kdb\_ mdZaZgby ^ey h[mqZxsbolk\_ydmish\_]hjhdhgljhey mki\_\Z\_fhklb

<hafh`gu\_ f\_ll\_hd\ms\_]h dhbgljmhqeZyxsboky</pre>

- mklguc hijhk gZ aZgylbyo
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- I\_klbjh\Zgb\_
- dhgljhev kZfhklhyl\_evguo jZ[hl \ibkvf\_gghc beb mklghc ı
- 11.4. F\_lh^bq\_kdb\_ mdZaZgby ^ey h[m̀q̂Zgsbkoikj thfihmi j h qbh Zll klZpbb

ljhf\_`mlhqgZy Zll\_klZpby h[mj\_q/Zmosk.1625lkj\$p\Zh\_pl\_gb\Zgb\_ijhf\_`mlhqguo qZh\_denvgguov]iZalmn\eh[mq\_gby ih ^bkp\blieexbqgZ\\_l Hgk\_[y

— aZq $\pm$ WIh nhjfZ hp $\_$ gdb agZgbdn[mhqZmsqb\fgkgydnd $\_$  bamq $\_$ gmq $\_$ [ghc ^bkpbiebgu \ p $\_$ ehf beb ijhf $\_$ `mIhqgZy ih hdhgqZglh[mqZxsbiflkyhI^ $\_$ evguf jZdab\b\ $_$ pedZifebgu k ZII $\_$ kIZpbhgghc hp $\_$ gdbeb @g $\_$ aZqI $\_$ gh $^a$ 

### $\label{localization} \mbox{Ebkl } \mbox{\ensuremath{\mbox{$\setminus$}}} \mbox{\ensuremath{\mbox{$g$}}} \mbox{\ensuremath{\mbox{$\downarrow$}}} \mbox{\ensuremath{\mbox{$$

>ZIZ \g_k_ baf_g_gbc ^hiheg_gb Ih^ibkv \g_k baf_g_gby	Kh^_j`Zgb_ baf_g_gbc b ^I	>ZIZ b ∢ ijhlhdhe aZk_^Zg dZnj_ư	
_			