

# INTERNSHIP FINAL REPORT



TURKCELL  
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## **A- Company Information (Turkcell)**

Turkcell is the biggest GSM operator company with 18 millions subscribers in Turkey. This company was formed in 1993. Since April 1998 they have been operating under a 25-year license, and from the beginning of their operation, Turkcell has invested more than 3.5 billion Dollars including license fee for network infrastructure. Their coverage of an area that, as of September 30, 2002, includes 100% of the population living in cities of 10,000 or more people. In 1999, Turkcell took ISO 9001 certificate because of its service quality. Turkcell has GSM roaming agreements with 350 operators in 140 countries, and also Turkcell has GPRS roaming agreements with 43 operators in 27 countries. Turkcell is also one of the biggest GSM operators in the world.

Turkcell has 2155 employees (1265 male, 890 female). 1725 of them graduated from universities (5 PhD, 212 masters, 1508 graduated). My internship is at Management System. There are seven main departments in Turkcell. These are Business Support, CEO Office, Finance, Marketing & Sales, Regulatory Services, Services & Product Development, and Technical Operations. Technical Operations has six sub-departments: Radio Network Operations, Core Network Operations, Engineering & Planning, Performance & Quality, Software Development, Procurement & Contracting. Core Network Operations has nine sub-departments: Network Control Center, Marmara Regional Management Center, Aegean Regional Management Center, Anatolia Regional Management Center, Charging & Billing, Services & Platforms, Central Support, Interconnect, and finally Management Systems. Organization of Turkcell is well organized, coordinated, and unstable. Unstable, because they change and reorganize their organizations once a year.

Turkcell focuses on GSM services like calling, sms, mms, sms information services (like golcell, Shubuo packets), logo & melody services, data services (GPRS, WAP). In my department(Management Systems/Core Network Operations/Technical Operations), they focuses on managing, controlling, regulating, and developing of databases, operating systems, and several software. Also, they focuses on reports and feedback of Core Network Operations. My supervisor (Ali Riza Peksen) is a team heads at Management Systems.

## **B- Overview of the Project (CNOW@P)**

### **1- Introduction**

My internship project topic is that to design Core Network Operations Department's interactive and dynamic wap portal which is supported and controlled by MySQL Database. By this portal, users can access to company database, and they can reach useful information easily. Also, this portal contains static company information and news. Because of different level secret information, security is one of the main goals of the project.

In this project, we are 3 persons. Haluk Avcıoğlu (Engineer in Turkcell) is supervisor of the project. Ersin Çokal (Internship Engineer) and Onur Sarkan (Internship Engineer), namely me, are developers and designers of the project. Ersin Çokal focused on static pages and contents of the portal. I preferred to focus on security, profiles, dynamic menu, database oriented control, dynamic and interactive applications. All security scripts, dynamic menu, five of six main functions, ten of eleven interactive applications were

designed by me. Haluk Avcioğlu focused on control of our works. An also, a big part of ideas about CNOW@P Portal like dynamic menu, database oriented control belong to him.

During the internship project, there were three stages. First stage is learning. First two weeks, I just learned how to write asp script, how to connect Access and MySQL databases. Second stage is design and development stage. About four weeks, main pages, applications, and security configurations are designed and developed. Last stage is about control and update. In last two weeks, we test each application, pages, and links a lot of times. Finally, we finished CNOW@P Portal.

I used WML (Wireless Markup Language) to display our portal's pages in cell phone browsers. My scripts are ASP(Active Server Pages) codes. To write ASP codes, I used Visual Basic as a scripting language. For database applications, I used SQL (Structured Query Language) and ADO (ActiveX Data Objects) to connect database. Company database, which I use is MySQL Database. I used PhpMyAdmin (GUI for MySQL Database) to reach database. All codes are available in Supplementary Materials.

## 2- Main Functions

For security and simple codes, I wrote and used main six functions by Visual Basic, SQL, and ADO. Except first function, these functions are designed by my self. These are six main functions:

### a- GetUserMSISDN:

By setting Turkcell MIEP (Mobile Internet Enable Proxy), when anybody visits our wap portal, Wap Gateway send visitor's phone number as a server variable to our server. This function takes this coded raw phone number, and it decodes it. Output is a real phone number of visitor. This function is designed by Tanju Engin (Engineer in Turkcell).

### b- GetUserName:

This function takes cell phone number as an input. It connect company database. If there is an employee record which has this phone number, function takes name of employee, and it display this name as an output. For example, we use this function at index page (Figure 1).



Figure 1(CNOW@P Index Page)

### c- GetUserProfile:

This function takes cell phone number as an input. It connect company database. If there is an employee record which has this phone number, function takes organizational information of employee, and it decide one of six profiles according to organizational criteria for visitor, and it display this profile as an output. If there is no record for cell phone number, output becomes "NOTAUTHORIZED".

#### d- LogUserVisit:

LogUserVisit is the most important and complex function in this project. It is complex because this function use GetUserName and GetUserProfile functions in itself. It is important because this function is the main part of security of the wap portal. It takes visitor's phone number. By using phone number, function call user name from database (by GetUserName function) and it reach user profile (by GetUserProfile function). This function request link of ASP files which is in it as a server variable. Function connect database, and it control user profile's permission for page, which visitor try to enter. If visitor profile's has a permission to enter, function insert time and date of visit, visitor name, phone number, link and name of page, and visitor's phone model to database as a log(Figure 2). If visitor profile's does not have a permission to enter, function does not allow visitor to enter. It send visitor to warning page about permission, and it insert same information to database (Figure 2). If visitor's phone number is not in database, function doesn't allow user to enter, and it send visitor to user request page. And, also it inserts same information (except user name) to database too (Figure 2). By this function, visitors can visit pages, only they have permission to visit, and also all visit information are saved to database.

←T→	DATE_TIME	MSISDN	FULLNAME	LINK_URL	LINK_NAME	HTTP_USER_AG
 	2003-09-29 11:09:38	905322100580	ISMAIL KESKIN	/index.asp?	Giriş	MOT-SAP4_/11.0 UP.Browser/4.1.2
 	2003-09-29 11:09:26	905353253031	Onur Sarkan	/cno/Uygulamalar/aktif_kullanicilar.asp?id=9053221...	Aktif Ziyaretçiler	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:25	905353253031	Onur Sarkan	/cno/Uygulamalar/aktif_kullanicilar.asp?	Aktif Ziyaretçiler	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:09	905353253031	Onur Sarkan	/cno/Uygulamalar/aktif_kullanicilar.asp?id=9053221...	Aktif Ziyaretçiler	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:07	905353253031	Onur Sarkan	/cno/Uygulamalar/aktif_kullanicilar.asp?	Aktif Ziyaretçiler	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:06	905353253031	Onur Sarkan	/cno/cnowap_links.asp?id=1	CNOW@P Anasayfa	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:05	905353253031	Onur Sarkan	/index.asp?	Giriş	YourWap Ericssc 380/2.63
 	2003-09-29 11:09:01	905322102029	HALUK AVCIOGLU	/CNO/cnowap_links.asp?id=31	CNOW@P Anasayfa	Nokia6310i/1.0 (4 Profile/MIDP-1.0 Configurati...
 	2003-09-29 11:04:48	905322100580	ISMAIL KESKIN	/cno/bcp/bcp_calltree.asp?id=339	BCP Arama Zinciri	MOT-SAP4_/11.0 UP.Browser/4.1.2
 	2003-09-29 11:04:44	905322100580	ISMAIL KESKIN	/cno/bcp/bcp_calltree.asp?	BCP Arama Zinciri	MOT-SAP4_/11.0 UP.Browser/4.1.2
 	2003-09-29 11:04:34	905322100580	ISMAIL KESKIN	/cno/bcp/bcp_calltree.asp?	BCP Arama Zinciri	MOT-SAP4_/11.0 UP.Browser/4.1.2

Figure 2(Log Table in Database)

#### e- ActiveUsers:

This function connects to database, and it takes number of visitors which have logs in database last fifteen minutes. Output is approximately number of currently visitors. By this function, visitors can see there are how many currently visitors in dynamic menu (Figure 3).

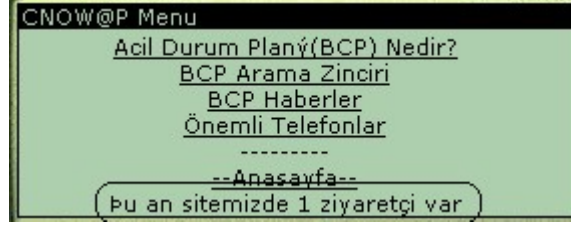


Figure 3(Active Visitor Number)

#### f- Converter:

Converter function takes string as an input, and it convert Turkish characters to English characters.

### 3- Dynamic Menu & Database Control:

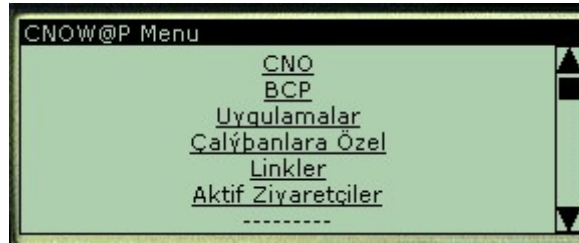


Figure 4(Dynamic Main Menu)

In our wap portal, there is no static menu page. Pages' information (page name, page link, related top link id, profiles' permissions, link sort) are saved to database (Figure 9). When user visit to our portal, ASP script connect to database, and it takes links from database, where visitor profile has permission. All visitors can only see links, which they have permission to enter. These menu pages are cyber pages. Main menu (Figure 4), cyber menu of CNO (Figure 5), cyber menu of BCP (Figure 6), cyber menu of employees' applications (Figure 7), and cyber menu of technical applications (Figure 8) are created by same script under control of database. Administrators can control, manage, and create new menus by only using database.

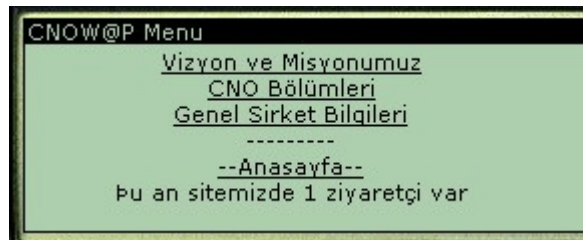


Figure 5(Cyber Menu of CNO)

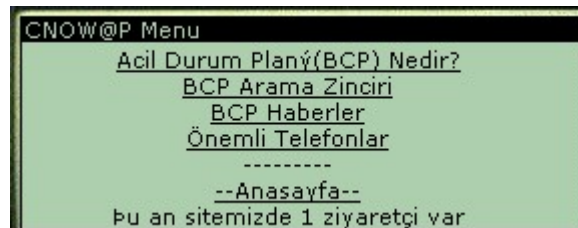


Figure 6(Cyber Menu of BCP)

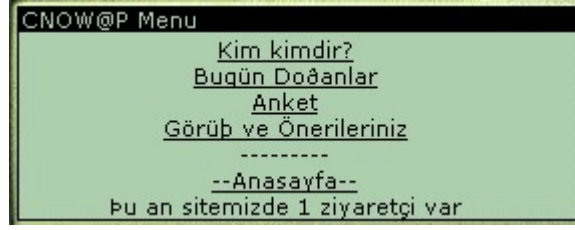


Figure 7(Cyber Menu of Employees' Applications)

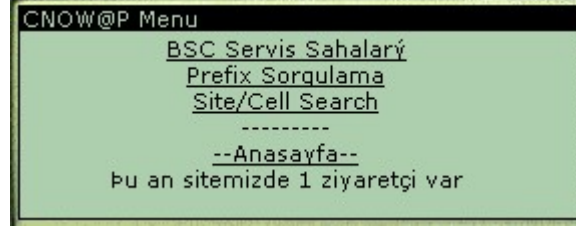


Figure 8(Cyber Menu of Technical Applications)

Id	Name	Link	View_Text	Related_Top_Link_id	Profiles
1	CNOW@P Anasayfa	/cno/cnowap_links.asp	Dinamik Menu	INDEX	ALL
2	BCP		BCP - Business Continuity Plan Acil Durum Planı i...	1	ALL
3	CNO Hedefler	/cno/cno_hedefler.php	CNO Hedeflerimizin neresindeyiz?	31	A0,A1,CNOHEADS
4	BSC Servis Sahaları	/cno/Uygulamalar/bsc_arama.asp	BSC Servis Sahaları	19	A0,A1,CNOHEADS
5	Sanal TeMIP	/cno/sanaltemip/index.php	Sanal TeMIP (Site Kesintileri)	19	A0,A1,CNOHEADS,CNO
6	Site/Cell Search	/cno/Uygulamalar/site_cell_search.asp	Site/Cell/CGI Search	19	ALL
7	BCP Haberler	/cno/bcp/bcp_deprem.asp	BCPWEB Haberleri	2	ALL
8	BCP Arama Zinciri	/cno/bcp/bcp_calltree.asp	BCP durumunda yapılacak çağrı zincirleri senaryosu	2	ALL
9	BCP Duyuru Bültenleri	/cno/bcp/bcp_duyuru_bultenleri.asp	BCP Duyuru Bültenleri	2	A0,A1,CNOHEADS,CNO
10	Genel Sirket Bilgileri		SIRKET BILGILERI, VERGI BILGILERI, ADRES ,TELEFONL...	31	ALL

Figure 9(CNOW@P Links Table in Database)

#### 4- Interactive Applications:

For Turkcell employees, especially Core Network Operations members, there are eight interactive, database supported applications in our portal. These applications are designed for employees needs. By these applications, visitors can reach some company information, and employees' records in database. Except Prefix Control, these applications are designed by my self.

## a- BCP Call Tree:

For extraordinary conditions, Turkcell has a lot of Business Continuity Plans. If there is an extraordinary event, some Turkcell employees have to coordinate these plans. One part of Business Continuity Plans is communication of coordinators. For this purpose, emergence call tree is prepared. Call tree information are saved to database (Figure 13). Our script connects to database, and it reaches Call Tree Information, each user can see their place in Call Tree by click just one link (Figure 10). Also they can search anybody in Call Tree by entering any name (Figure 10) and script display results (Figure 11). To see detailed result, visitor clicks a name, and call tree information is displayed on the screen (Figure 12).

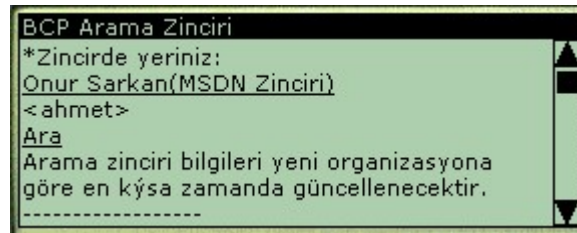


Figure 10(BCP Call Tree Search Page)



Figure 11(Search Result Page)



Figure 12(Detailed Result Page)

←T→	ID	UNIT	USER_FULLNAME	MSISDN	DIGER_TEL_NO	ARAYACAGI_KISININ_ID	OPTION	
		1	MSDN	NCC_SL	5322229921	5322229991	2	First
		2	MSDN	Suleyman Kacar	5322100049	2165736137	3,4	
		3	MSDN	Eyup Dilaver	5322100895	2165731967	4	
		4	MSDN	Ayhan Buyukulcay	5323129601	2128754727	5	
		5	MSDN	Atilla Gurelman	5322100099	2163165117	6	
		6	MSDN	Erce Bolukbasi	5322100427	2163603029	7,8,9,10,11	
		7	MSDN	Baki Aydogan	5322100055	2122892409	12,14	
		8	MSDN	Hakan Tokay	5322100299	2164673181	16,17,18,19,20	
		9	MSDN	Kaan Temel	5322100344		21,22,23,24,25,26,27,28	
		10	MSDN	Ali Riza Peksen	5322101241		29,30,31,32	
		11	MSDN	Melike Beykoz	5322100905	2164851636	33,34,35	
		12	MSDN	Ender Esen	5322101316	2122803858	13	
		13	MSDN	Gunseli Gokalp	5322101087	2164116613		
		14	MSDN	Mustafa Oz	5322102053	2164557588	15	
		15	MSDN	Haluk Avcioglu	5322102029	2164419813		
		16	MSDN	Nihal Akbulut	5322101433	2122910389		

Figure 13(BCP Call Tree Table in Database)

#### b- Base Station Controllers Information Search:

In Turkcell GSM Network, there are 144 Base Station Controllers. These BSC's services area and node name information are saved to database (Figure 16). BSC Area application allows us to search according to location name and node name in database. Visitor writes any location or node name in BSC search page (Figure 14), and results are displayed in result page (Figure 15).

Figure 14(BSC Search Page)

Figure 15(BSC Result Page)

←T→		BSC	AREA
		ASTM1B1	Aydin ( Didim,Akbük,Kusadasi,Davutlar. )
		ASTM1B2	Aydin ( Merkez,Çine,Germencik,Nazilli,Söke,Umurlu,...
		BDLM1B1	Mugla ( Merkez,Yatagan,Milas,Bayir,Kavaklidere)
		BDLM1B2	Mugla ( Fethiye,Göcek,Dalaman,Gökova,Ören,Köycegiz...
		BDLM2B1	Mugla ( Marmaris, Datça,Aksaz )
		BDMM1B1	Mugla ( Bodrum Merkez,Gümbet )
		BDMM1B2	Mugla ( Bodrum Yalikavak,Gümüslük,Turgutreis,Torba...
		BLKM1B1	Balikesir ( Bandirma,Ayvalik,Burhaniye,Edremit,Akç...
		BLKM2B1	Balikesir ( Merkez,Erdek,Gönen,Avsa,Susurluk,Manya...
		BLKM3B1	Çanakkale, Edirne (Kesan)
		BRM01B1	Bursa ( Armutlu,Mudanya,Gemlik,Besyol,Çinar,Demirt...
		BRM02B1	Bursa ( Orhaneli,Inegöl,Uludag,Gürsu,Kestel)
		BRM02B2	Bursa ( Ertugrul,Nilüfer,Çali,Gümrük,Hipodrom,Yunu...
		BRM03R1	Bilecik,Bursa ( Uludag,Irfaniye,Karacabey,M.Kemal ...
		BRM03R2	Yalova ( Merkez,Çinarcik,Termal,Elmalik,Dört Yol,Ki...

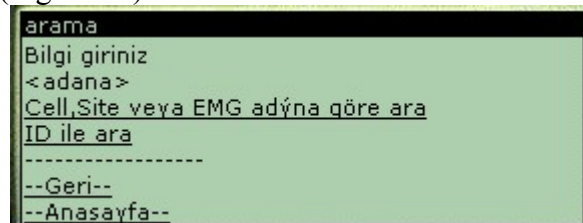
**Figure 16(BSC Table in Database)**

**c- Prefix Control:**

By this application, visitors can search prefix information in database by their cell phones.

**d- Site/Cell Search:**

In Turkcell GSM network, there are 16335 cells and approximately 7000 base station sites. These cells' and sites' technical information are saved to database. By this application, visitors can search cell and site information in database with their cell phones by connecting database. Visitor writes cell, site, emg name or id in search page (Figure 17).



**Figure 17(Site/Cell Search Page)**

Results are displayed in result page (Figure 18).

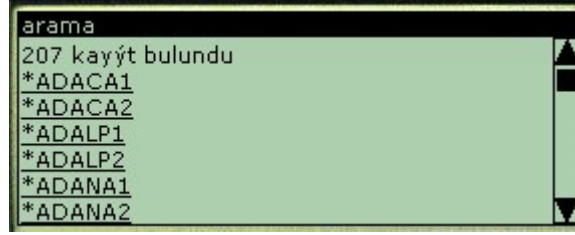


Figure 18(Site/Cell Search Result Page)

Visitor can see detailed result about cell in detailed result page (Figure 19) by just clicking cell name.



Figure 19(Site/Cell Search Detailed Result Page)

#### e- Employees' Information Search:

All employees' information is available in database. Employees Information Search application allows us to search Turkcell employee's information in database by just entering name with cell phone in search page (Figure 20). Results are displayed in result page (Figure 21). For detailed information, visitor clicks one of the results, and detailed information is displayed in the detailed result page (Figure 21).

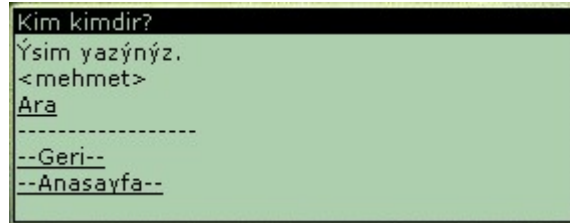


Figure 20(Employees' Information Search Page)

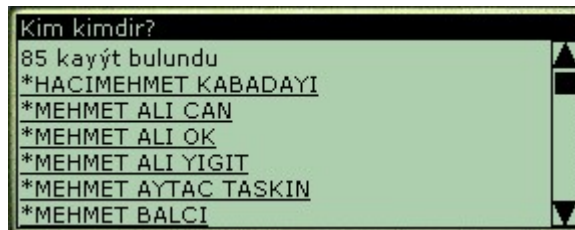


Figure 21(Employees' Information Search Result Page)



Figure 22(Employees' Detailed Information Page)

**f- Employees' Birthday News:**

Whenever anybody visits this application, asp script connect to database, it takes employees' names that have birthday today, and it displays on the screen (Figure 23). If visitor click one of these name, script send visitor to Employees Information Search Application, and visitor can see information of employee who has birthday automatically (Figure 24).

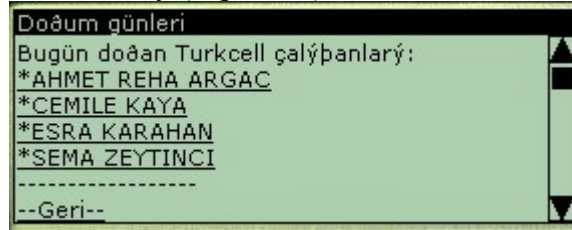


Figure 23(Employees' Birthday News Page)

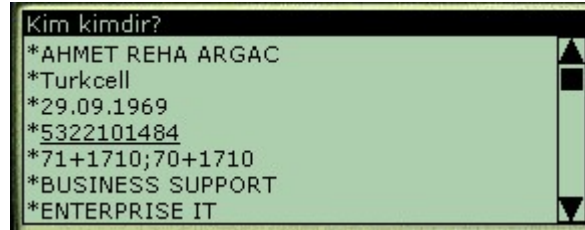


Figure 24(Detailed Information Page)

**g- CNOW@P Questionnaire:**

This questionnaire is the first questionnaire in our portal. In the future, admins will design new questionnaire. In this application, question is "How is CNOW@P Portal according to you?". Optional answers are very good, good, normal, and bad (Figure 25). Application connect database (Figure 27), it insert answer, it calculate result automatically, and it display in phone screen (Figure 26). Each visitor can only answer one time.

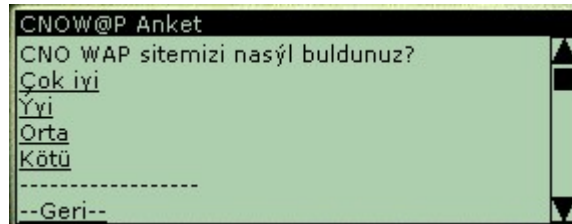


Figure 25(CNOW@P Questionnaire Page)

```

CNOW@P Anket
Anketimize 9 kiþi katýlmýþtýr.Sonuçlar:
cokiyi=7kiþi
iyi=2kiþi
-----
--Geri--
--Anasayfa--

```

Figure 26(Questionnaire Result Page)

←T→		MSISDN	FULLNAME	CEVAP	DATE_TIME
		905353253031	Onur Sarkan	cokiyi	2003-09-19 13:48:39
		905322100097	AYDIN OZUSTA	cokiyi	0000-00-00 00:00:00
		905322102029	HALUK AVCIOGLU	cokiyi	2003-09-19 18:46:29
		905327165058	CEM ONUR PALA	cokiyi	2003-09-19 14:13:38
		905322100947	HUSEYIN KELES	iyi	2003-09-19 14:27:16
		905322100524	VEHBI CELIKBAS	cokiyi	2003-09-20 23:03:19
		905322100852	TANJU ENGIN	cokiyi	2003-09-21 16:02:43
		905322102053	MUSTAFA OZ	cokiyi	2003-09-24 18:20:40
		905322101241	ALI RIZA PEKSEN	iyi	2003-09-24 21:02:58

Figure 27(Questionnaire Table in Database)

#### h- Feedback Application:

By this application, visitors can give us feedback about our portal. Visitor enters text (Figure 28). Script connects to database and it inserts this text (Figure 30).

This application is very beneficial in test stage of our portal.

```

Görüp ve Önerileriniz
Görüp ve önerilerinizi yazýnýz.
<güzel olmus>
Kayýt
-----
--Geri--
--Anasayfa--

```

Figure 28(Feedback Page)

```

Görüp ve Önerileriniz
Görüp ve önerileriniz sistemimize
kaydedilmiþtir.Teþekkürler.
-----
--Geri--
--Anasayfa--

```

Figure 29(Feedback Result Page)

←T→		MSISDN	FULLNAME	GORUS_ONERI
		905326661413	BARIS AKSEN	WapOnur eline saglik olm. Wap sitesi deil sanki in...
		905322101241	ALI RIZA PEKSEN	BCP arama zincindeki Anasayfa baglantisi hata veri...
		905322101241	ALI RIZA PEKSEN	Ss deneme
		905322101241	ALI RIZA PEKSEN	Anket sonucunda yer alan sayilarin toplami ile kat...
		905322100774	ILHAN AY	elinize saglik. cok basarili bir uygulama.
		905322100774	ILHAN AY	kisisel bilgiler menusune dahili telefon numaralar...
		905353253031	Onur Sarkan	deneme

Figure 30(Feedback Table in Database)

**i- Last Ten Earthquakes:**

In CNO Web Portal, earthquakes' information is updated automatically, and these are saved to a text file. Our application script read this text file, and it display last 10 earthquakes' information (Figure 31).

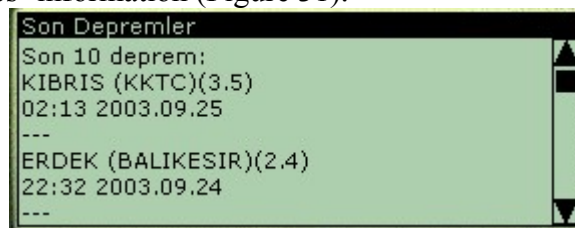


Figure 31(Last Ten Earthquakes Page)

**j- Active Visitors' Information:**

This application connect database, it calls visitors' names and their cell phone numbers, who have logs in last 10 minutes. It displays these names on the screen as a link (Figure 32). When visitors click these links, they can see information of other active users (Figure 33).

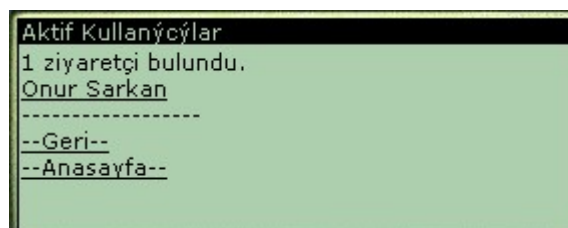


Figure 32(Active Users Page)

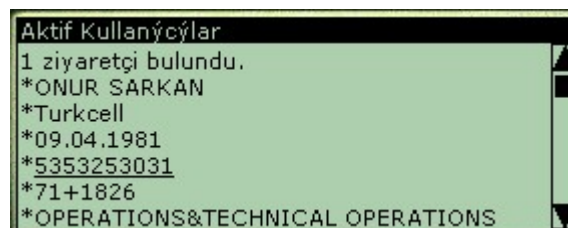


Figure 33(Active Users' Detailed Information Page)

### k- Unknown User Request Application:

Some employees' phone numbers are not saved to database. For these events, if visitor's profile is "notauthorized", log function sends him or her to Unknown user request application. Visitor writes her or his name and department in Turkcell (Figure 34). Application inserts visitor's name, department name, and cell phone number to database (Figure 36). If visitor has already another user request application which was denied, script displays it in Figure 38. If old application is not controlled yet, script displays it in Figure 37.

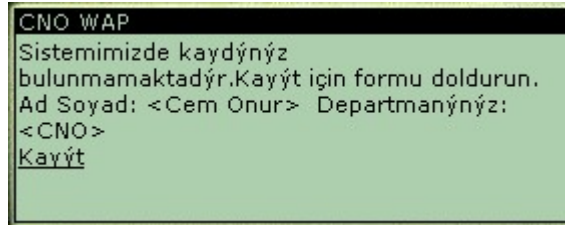


Figure 34(Application Page)

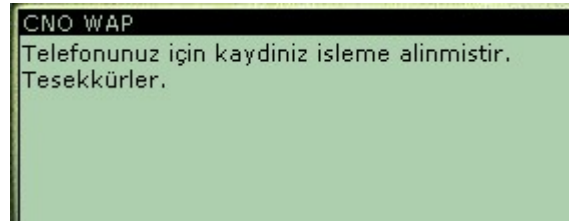


Figure 35(Application Result Page 1)

←T→		44_mobile	03_cn	User_Department	Request_Time	STATUS
		905329999999	Cem Onur	CNO	2003-09-30 09:05:20	REDDEDİLDİ
		905353253031	haluk avcioglu	cno	2003-09-29 13:35:12	ONAY_BKL

Figure 36(Applicant Information Table in Database)

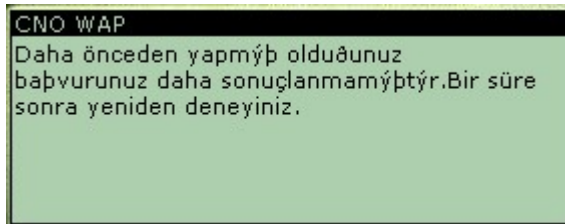


Figure 37(Application Result Page 2)

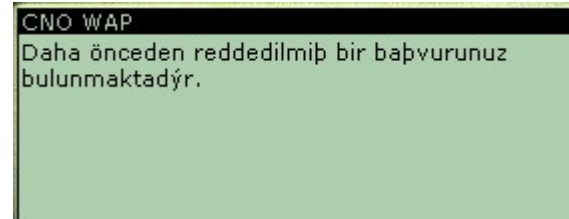


Figure 38(Application Result Page 3)

## **C- Internship Experiences**

By this internship and project, I learned basics of mobile GSM communications because first three days, we read documents and books about GSM technologies. Supervisor gave me CNO@P project. To be successful in this project, I learned WML (Wireless Markup Language), ASP(Active Server Pages), Visual Basic, SQL(Structured Query Language), MySQL database management, and basics of WAP technologies. I also learned basics of TCP/IP (Transmission Control Protocol/Internet Protocol) and data networks by certificated engineering education program with real applications.

My supervisor gave me full responsibility of this project, but he has been ready to help whenever I need help. I learned importance of time schedule and supervisor control. I also learned importance of team work. This internship will have influence on my future carrier plans. Before internship, I had wanted a job which oriented on communication hardware. By internship, I explored software oriented job opportunities for me.

## **D- Objectives about Internship**

When I came to Turkcell, I supposed that I would work in system salons; I would plug a lot of cables, and go around in Istanbul to control GSM Network components like base stations. But, I learned that in Turkcell there are a lot of different works. GSM Technical Operations don't include only hardware staff. I also learned that university education and real job experiences are very different. University education gave me a background, I can easily understand a lot of technical process by university courses, but job is not learned by university. Job is learned by beginning to work. Education gives just a background. For example, I understand easily basics of wap technologies by classroom knowledge, but designing database oriented dynamic wap portal different from classroom knowledge.

## **E- CONCLUSION**

As a conclusion, I understand that university education and real job environment have some similarities and differences. The main similarity, learning and education don't end. Always, there are a lot of things to learn to be successful. The main difference is that in university, we learn theoretical information in university. But in job environment, engineers focus on solving problems, practical information is important. I have an experience about this difference. When I visited system salons, there were a lot of integrated circuit cards. I asked that how these cards work. Engineer replied "Internal working process is not my business, my business is that what these cards do, and how can I fix it when these cards have problem." My recommendation to junior students is that if they prefer to be engineer instead of academic carrier, internship is very beneficial. It is simulation of real life. After this simulation, namely internship, I decide to be engineer instead of academic carrier, because it is more suitable for my personality.